THE IRON AGE

Published every Thursday Morning by David Williams Co., 14-16 Park Place, New York.

Vol. 79: No. 11. *New York, Thursday, March 14, 1907.* $5.00 a Year, including Postage. Single Copies, 15 Cents.

Reading Matter Contents .....page 861
Alphabetical Index to Advertisers " 191
Classified List of Advertisers " 182
Advertising and Subscription Rates" 190

FORSTER PULLEY WORKS, Cuba, N. Y.

The American Mfg. Co.
Ropes and Twines
65 Wall Street, New York

Bristol's Patent Steel Belt Lacing

SAVES
Time, Belts, Money.
Greatest Strength with Least Metal
Send for Circular Q and Free Samples.

THE BRISTOL CO., Waterbury, Conn.
New York: 114 Liberty St.
Chicago 753 Monadnock Bldg.

SAMSON SPOT CORD

Also Massachusetts and Phoenix Brands

SAMSON CORDAGE WORKS, Boston, Mass.

TURNBUCKLES

Branch Office, 11 Broadway, New York.
Cleveland City Forge and Iron Co., - Cleveland, O

TURNBUCKLES.

MERRILL BROS.,
465 to 471 Kent Ave.
Brooklyn, E.D., N.Y.

SOFT COAL.

Pilling & Crane
Girard Building, Phila.
Machesney Bldg., Pitts'g
Empire Bldg., New York

HOW IS
ROOFING TIN
MADE?

Our Booklet "From Underfoot to Overhead" describes the process thoroughly. Sent free upon request.

See
AMERICAN
SHEET & TIN PLATE
COMPANY'S
Ad. on Page 16

U.M.C.
METALLIC CARTRIDGES

The leading boys' papers—"Youth's Companion," "American Boy," "Star Monthly," etc., carry in season U. M. C. advertising. For years boys have been taught to call for "U" Cartridges. They specially prefer U. M. C. .22 ungreased as they don't soil the pockets. Are you well stocked?

U. M. C. .22s are as well known to boys as U M. C. Shot Shells to men.

The
Union Metallic Cartridge Co.
Bridgeport, Conn.

Agency, 313 Broadway, New York City.

WATER TUBE BOILERS
The Babcock & Wilcox Co.
85 Liberty Street
New York
See page 53

SOLD UNDER this TRADE MARK
"The Best Horseshoe Nails in the World"

"The Capewell"

This Trade Mark

"The Capewell"

Guarantees Satisfaction to all Purchasers

Made by THE CAPEWELL HORSE NAIL COMPANY
HARTFORD, CONN., U. S. A.

JENKINS BROS. VALVES
STANDARD PATTERN.

Made of new steam metal of the best grade. Fitted with the *Jenkins Disc*, assuring an absolutely steam tight valve under all ordinary pressures. When fitted with a *soft* Jenkins Disc they are the most satisfactory valves that can be obtained for use on water, air or gas. All parts interchangeable. Every valve bearing the Trade Mark is guaranteed.

JENKINS BROS., New York, Boston, Philadelphia, Chicago, London.

"Swedoh" Cold Rolled Steel is unexcelled for **Drawing** and **Stamping**
THE AMERICAN TUBE & STAMPING COMPANY
(Water and Rail Delivery) BRIDGEPORT, CONN.
SEE PAGE 21.

MAGNOLIA METAL.
Best Anti-Friction Metal for all Machinery Bearing.

Fac-Simile of Bar. Beware of Imitations.

MAGNOLIA METAL CO.
Owners and Sole Manufacturers, Chicago, Fischer Bldg.
113-115 Bank Street, NEW YORK.
San Francisco, Montreal and Pittsburg. We manufacture all grades of Babbitt Metals at competitive prices.

THE REASON WHY

our large mills are taxed to their utmost capacity, is because our products are known to be of the

HIGHEST QUALITY

This applies equally to

BRIGHT CHARCOAL

or

ROOFING TIN PLATE

or

SPECIAL FINISHED BLACK SHEETS

FOLLANSBEE BROS. CO.

makers of

SCOTT'S EXTRA COATED

and

FOLLANSBEE-BANFIELD PROCESS

PITTSBURGH

Louisville, Rochester, Memphis, Cleveland, Buffalo, Norfolk, Indianapolis, Nashville

BRASS { SHEET, ROD, WIRE

COPPER { SHEET, ROD, WIRE

GERMAN SILVER { SHEET, ROD, WIRE

LOW BRASS, SHEET BRONZE. SEAMLESS BRASS AND COPPER TUBING, BRAZED BRASS AND BRONZE TUBING : : : : :

WATERBURY BRASS CO.,

WATERBURY, CONN.

99 John St., New York. Providence, R. I.

Bridgeport Deoxidized Bronze & Metal Co.

BRIDGEPORT, CONN.

Phosphor and Deoxidized Bronze

Composition, Yellow Brass and Aluminum Castings, large and small

The Plume & Atwood Mfg. Co.

MANUFACTURERS OF

Sheet and Roll Brass

AND

WIRE

Printers' Brass, Jewelers' Metal, German Silver and Gilding Metal, Copper Rivets and Burrs. - - -

Pins, Brass Butt Hinges, Jack Chain, Kerosene Burners, Lamps, Lamp Trimmings, &c.

279 Broadway, NEW YORK.

Room 508 Heyworth Building, East Madison St., CHICAGO, ILL.

Rolling Mill: THOMASTON, CONN. Factories: WATERBURY, CONN.

SCOVILL MFG. CO.

MANUFACTURERS OF

BRASS, GERMAN SILVER,

Sheets, Rolls, Wire Rods, Bolts and Tubes, Brass Shells, Cups, Hinges, Buttons, Lamp Goods.

Special Brass Goods to Order.

FACTORIES: WATERBURY, CONN.

DEPOTS NEW YORK. CHICAGO. BOSTON.

Matthiessen & Hegeler Zinc Co.,

LA SALLE, ILLINOIS.

SMELTERS OF SPELTER

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc cut to order. Rolled Battery Plates.
Selected Plates for Etchers' and Lithographers' use.
Selected Sheets for Paper and Card Makers' use.
Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

Henry Souther Engineering Co.

HARTFORD, CONN.

Consulting Chemists, Metallurgists and Analysts.

Complete Physical Testing Laboratory.
Expert Testimony in Court and Patent Cases.

Arthur T. Rutter & Co.

256 Broadway

NEW YORK

Small tubing in Brass, Copper, Steel, Aluminum, German Silver, &c. Sheet Brass, Copper and German Silver. Copper, Brass and German Silver Wire. Brazed and Seamless Brass and Copper Tube. Copper and Brass Rod.

BRASS FOUNDERS FINISHERS J. J. RYAN & CO.

105-109 So. Jefferson St., Chicago.

Best Bronze, Babbitt Metals, Brass and Aluminum CASTINGS On Short Notice

THE BRIDGEPORT BRASS CO.,

BRIDGEPORT, CONN.

Postal Telegraph Building, Broadway and Murray St., New York.
85-87 Pearl St., Boston.
17 N. 7th St., Philadelphia

MANUFACTURERS OF

Brass AND Copper { SHEET, TUBING, WIRE

Metal Goods made to order from Sheet, Rod, Wire and Tubing.

GERMAN SILVER | **NICKEL ANODES** BRASS, BRONZE, and COPPER

The Seymour Mfg. Co., - - Seymour, Conn.

HENDRICKS BROTHERS

PROPRIETORS OF THE

Belleville Copper Rolling Mills,

MANUFACTURERS OF

Braziers' Bolt and Sheathing

COPPER,

COPPER WIRE AND RIVETS,

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.

49 CLIFF ST., NEW YORK.

Trade Mark

PHOSPHOR-BRONZE

GERMAN SILVER

THE RIVERSIDE METAL CO.

RIVERSIDE, N. J.

THE IRON AGE

New York, Thursday, March 14, 1907.

The Providence Gas Engines and Producers.

A horizontal gas engine particularly adapted for operating on gases of low heat value, such as producer and blast furnace gases, has been developed and is being put on the market by the Providence Engineering Works, Providence, R. I. The company has also brought out a gas producer, which together with examples of the engines, is shown in the illustrations. It will be noted that both engines and producer are along the lines of English designs. They are claimed to embody the latest improvements, their designs having been based on years of experience, and tests have demonstrated that the cost of fuel, oil and water is low for the type.

The three engines shown are for different purposes but all operate on the Beau de Rochas or Otto four-stroke cycle. Fig. 1 is the double-cylinder type for large power only and where close regulating is necessary. Fig. 2 shows a single-cylinder engine direct connected to an electric generator, a flexible coupling being used, which is a common practice abroad but one just coming into use in America. By means of the coupling the necessity of absolutely exact alignment of the generator and engine shafts is avoided. Fig. 3 is the engine for ordinary use in works where no close regulating is required and where small units of power are employed.

In common with other horizontal gas engines the main bearings are not enclosed and can be examined while the engine is running. In fact all parts of the engine are easily accessible for inspection and repairs, with everything in plain view. A simple and efficient valve gear is employed. Neither valves nor pistons require water cooling in engines of moderate size, thereby considerably reducing the consumption of water. The simple operation of removing the piston is important when using producer gas, for the piston requires cleaning every few months. To remove the piston it is not necessary to remove cylinder covers or gearing or break any pipe or water

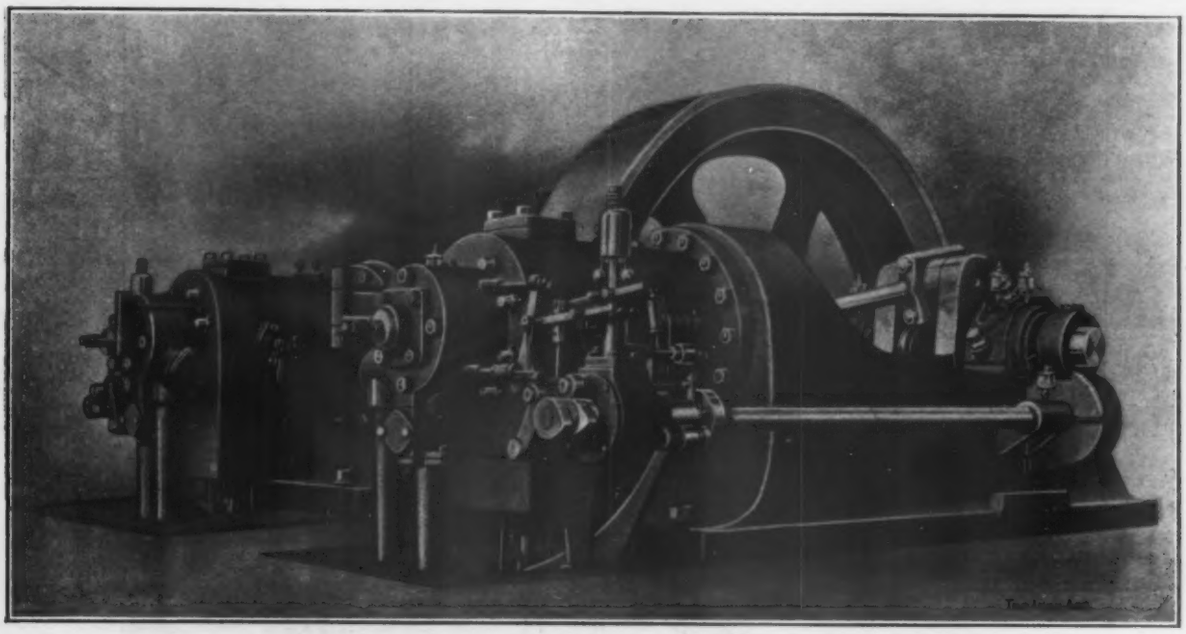


Fig. 1.—The Two-Cylinder Gas Engine Built by the Providence Engineering Works, Providence, R. I.

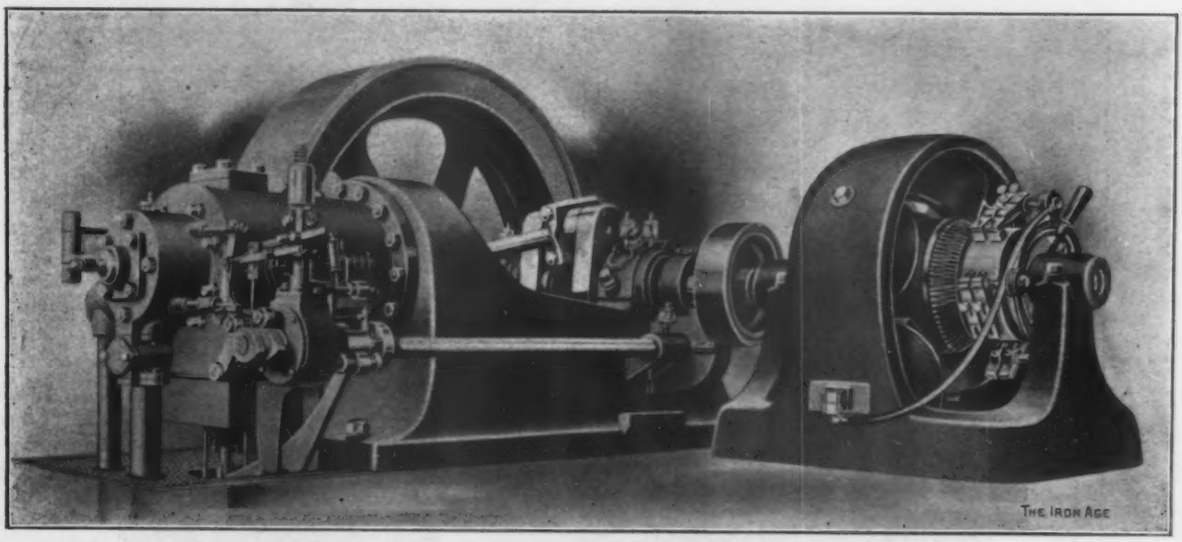


Fig. 2.—A Single-Cylinder Providence Gas Engine Directly Connected through a Flexible Coupling to an Electric Generator.

joints. Any dust or deposit from the charge, or any carbon from the oil falls to the bottom of the cylinder and is blown out through the exhaust which always occupies a low position. The inside of the cylinder is smooth, containing no ports, passages or flat surfaces for the accumulation of dirt or carbonized oil or other matter that may find its way into the cylinder, causing back-firing, preignition or other troubles. The cylinder has a removable liner of special hard cast iron which reduces wear between the piston and the cylinder and allows for the expansion of the metal in contact with the hot gases and relieves the cylinder casting from severe strains. The replacing of the liner may be accomplished without returning the cylinder to the factory. A variable timed magneto igniter is used; the governing is sensitive, and the balance weights are placed on the shaft and not on the fly wheel. The steel crank shaft is cut from a solid forging and runs in long adjustable bearings.

The suction gas producer is designed to generate a cheap and efficient gas for small engines as well as large ones, and is made to suit the company's different sizes of engines. It is intended to fill the demand for a producer which can be placed beside the engine, even in inclosed spaces, and will be reasonably cheap, perfectly safe and require little attention. Tests have shown that when the producer is applied to gas engines as small as 10 hp. the cost of fuel does not exceed two cents an hour for the 10 hp., and with large powers the cost is even less. This is on the basis of a good quality of anthracite coal delivered at the works at $4.50 a ton.

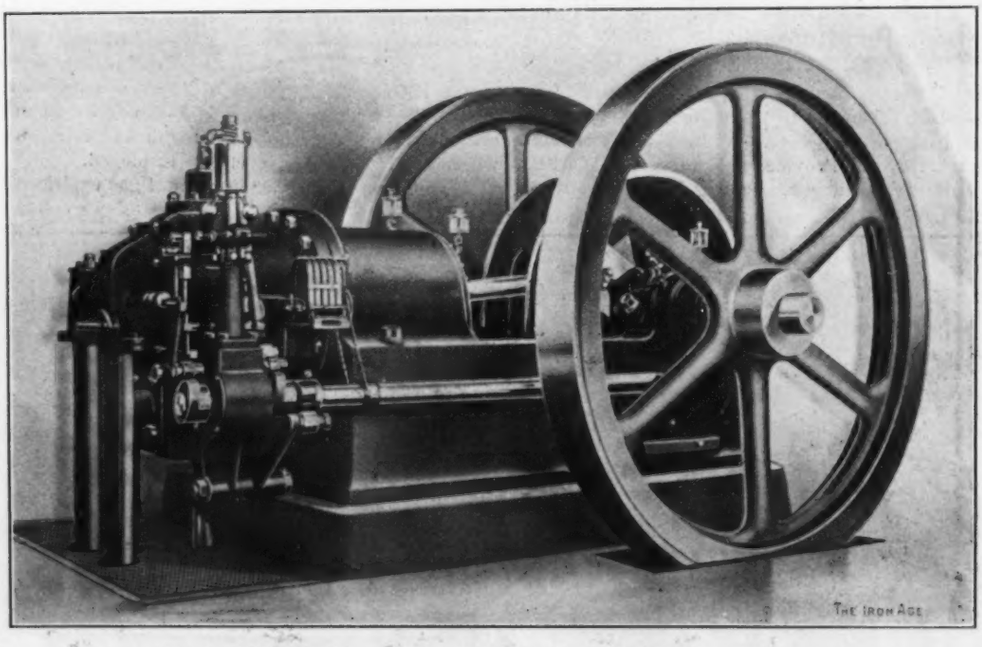


Fig. 3.—The Small Power Type of the Providence Producer Gas Engine.

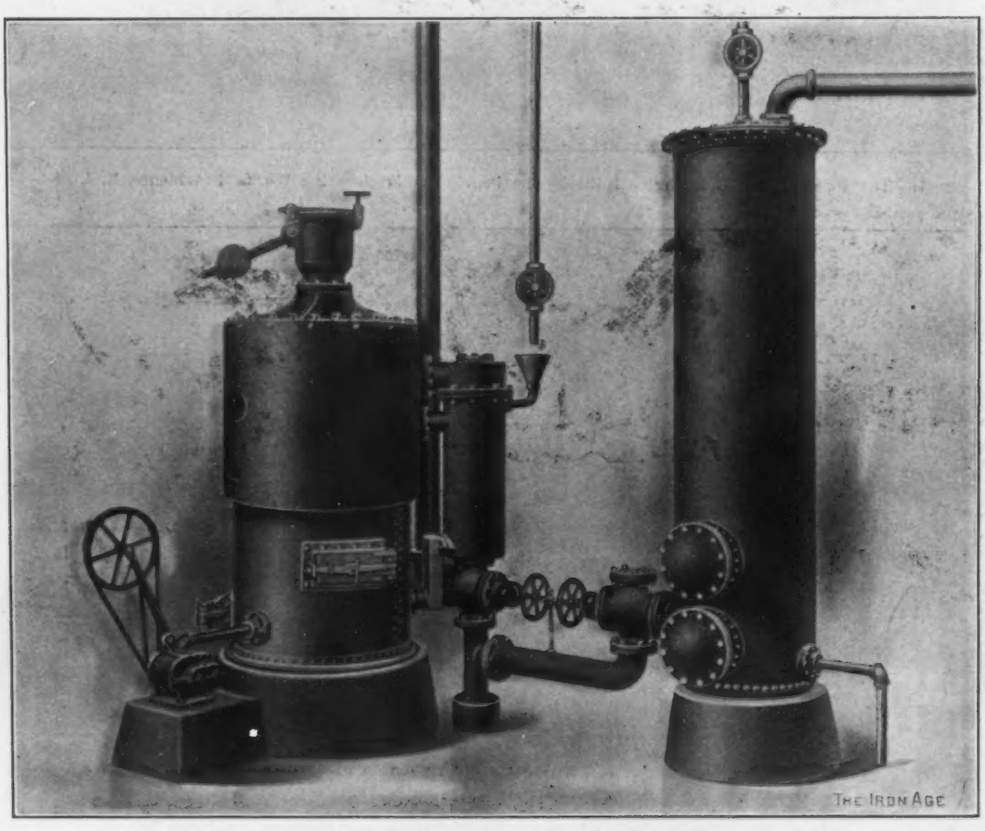


Fig. 4.—The Suction Gas Producer Built by the Providence Engineering Works.

Other aims in the design of the producer were to have it occupy small space, be simple in design, not liable to get out of order or expensive to repair, easy to put into operation and automatic in action, to require little attention and employ unskilled labor, create no nuisance even in confined spaces, and be regenerative in principle. The result is shown in Figs. 4 and 5, which, however, omit a part in the piping system between the generator and scrubber, because patents on the device are pending.

The producer consists of a steel sheet lined with fire brick and containing a grate. Below the grate is the ashpit. Suitable airtight doors are provided above and below the grate for cleaning the fire and removing ashes and clinkers. On top of the producer is a cast iron cover containing the fuel storage chamber and also a cast iron hopper for introducing the charge of fuel to the top of the fire. The hopper is constructed with a double

The use of the regenerative principle is a feature of much importance. The air used for making the gas and the steam for its enriching are heated by waste heat from the generator. The fuel which is converted into gas is also heated by waste heat from the generator before it reaches the combustion zone. Altogether the loss of heat through the process is reduced to a minimum and the efficiency is correspondingly high.

In the operation of the producer, while the fire is being started and the hand blower is being used the waste pipe L is opened to allow the products of combustion to escape to the atmosphere. After the fire is burning properly and the correct quality of gas has been ascertained the engine is started. Thereafter its suction causes air to be drawn through the inlet A around the shell of the producer where it is heated before being conveyed to the vaporizer B. Here it becomes charged with the necessary amount

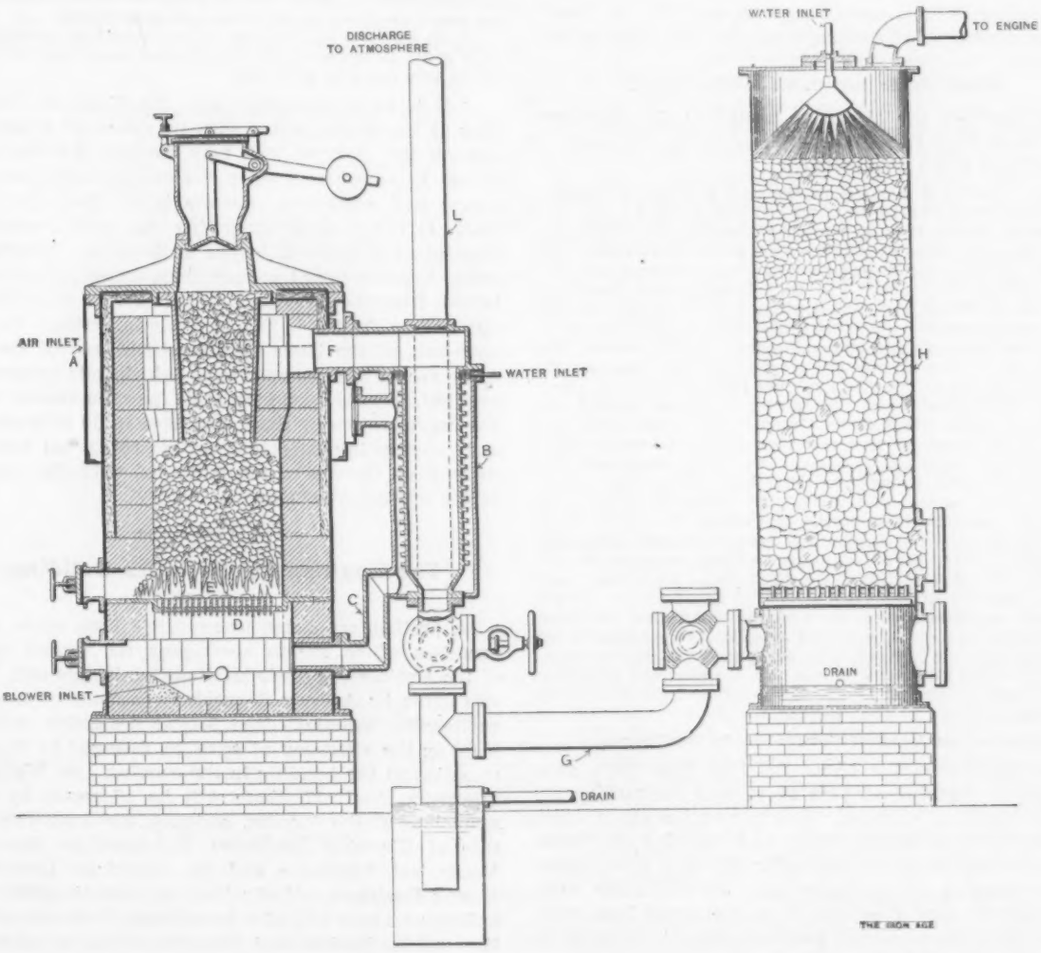


Fig. 5.—Vertical Sections of the Generator, Vaporizer and Scrubber of the Providence Suction Gas Producer.

closing device to prevent air from entering the producer at the time of charging the fuel, since the producer, being under suction, has less than atmospheric pressure within it.

The vaporizer B, Fig. 5, for supplying steam to enrich the gas, surrounds the gas pipe from the generator, which is provided with circular ribs cast around its outer surface. A small quantity of water being permitted to fall in a constant flow over these ribs, is immediately vaporized by the heat of the gas. The steam thus formed mixes with the hot air and passes down into the ashpit and to the under side of the fire. After the gas leaves the vaporizer it is taken to the scrubber where it is cooled and cleaned before being admitted to the engine cylinder. The regulation of the flow of water at the water inlet is very exact, for it is important that neither too much nor too little steam be mixed with the air, the right proportion depending on the load on the engine. A small hand fan is provided for blowing up the fire when starting.

of vapor produced by the heat of the gases. The mixture of air and vapor then passes down the pipe C and into the ash pit D, and thence up through the grate and incandescent fuel E, where it is decomposed. The gas resulting from the decomposition is led from the outlet F in the generator, through the vaporizer B, and connecting pipe G, to the coke scrubber H. The coke in the scrubber is kept moist and the gas cooled by running water through it. All the waste water passes through a pipe into a water sealed tank from which it is led away to any convenient drain.

McMinn & Quigley, Mason Building, 70 Kilby street, Boston, Mass., have made arrangements to represent the John Illingworth Steel Company, Frankford, Philadelphia, Pa., as sole Eastern agents. The firm is composed of Harry F. McMinn, formerly with the John Illingworth Steel Company, and Harry T. Quigley, formerly with Wetherell Bros.

Electrolytic Corrosion of Iron and Steel in Concrete.

In a paper read at the two hundred and fourteenth meeting of the American Institute of Electrical Engineers at New York, March 1, 1907, A. A. Knudson presented the results of research he had carried on for several years to ascertain whether concrete will afford iron and steel the same protection from stray currents of electricity as it gives against ordinary corrosion or rust. In addition to the laboratory experiments detailed the author of the paper refers to two practical cases of the recognition of electrolytic action in important steel structures. The first of these is the bridge over the Gowanus Canal, South Brooklyn, N. Y., at Hamilton avenue. The Bridge Commissioner, in his report for the year ending June 30, 1906, said that the foundation walls developed some rather serious cracks on both sides of the canal, with a movement of the walls toward the center of the canal.

Electrolytic Action on Bridge Steel.

To ascertain the electrical conditions, Mr. Knudson made some tests at the above mentioned bridge, the results of which are thus stated:

The voltmeter readings show the steel structure to be positive to the canal, positive to water mains in the street, and positive to the trolley rails on the bridge, ranging from 0.5 to 1.5 volts. These readings were taken when the car traffic was light. Some of the cracks on the concrete had been plastered over, but others were quite visible. The tests indicate that the trolley tracks on the bridge are in connection with the steel structure. Tests were also made on another bridge of the same construction a little further north over the same canal, at Ninth street. The readings here were exactly the reverse of those found at the Hamilton avenue bridge, the structure being negative to canal, to water mains and tracks. There were no visible cracks in the concrete of either foundation. Although the cracks in the concrete of the Hamilton avenue bridge are attributed to other causes in the commissioner's report, we believe these tests and observations point strongly to electrolytic action from trolley currents as being the true cause. This seems to us the more reasonable cause for these cracks, in view of the results of our laboratory experiments. Ordinary care would suggest that costly structures of this kind should be periodically inspected for evidence of electrolytic action upuon the interior steel work, especially if located contiguous to water, or in the vicinity of electric railroads or railroad power stations, as in the case just cited. Furthermore, this question should be carefully considered when such structures are planned, tests made at locations of proposed bridges or other structures, to ascertain the electrical conditions and the possibilities of injury due to electrolysis from stray currents.

Protection Against Corrosion in Buildings.

The paper cites the Times Building, New York, as a conspicuous instance of care to prevent destructive action of electrical currents. One precaution taken there was the through waterproofing and draining of retaining walls, this being carried under the floor of the press room occupying the subbasement. As a further safeguard all the steel members up to the street level were encased in Portland cement mortar to the minimum thickness of ¾ in. This is effectual protection against rust deterioration, and is believed to be also against electrolytic disintegration. As perfect insulation as possible is also provided, there being sufficient grounding to relieve any electrical tension which may exist in any part of the steel frame by drawing off the current at points where electrolytic action cannot be set up.

Accompanying the paper are views of two water meters, the under sides of which were practically destroyed by electrolysis while in service in the cellars of dwellings in a city distant from New York. These cases, which are by no means isolated, illustrate how trolley line currents will follow a service pipe for a considerable distance from the tracks, enter a building, and find an outlet to ground on the damp soil of a cellar. This furnishes an opportunity for current to pass into the iron foundations of large buildings where such service pipes, either water or gas are connected, as they usually are, to the framework of such structures. Mr. Knudson has discovered many similar cases of current straying into buildings in different cities in this country. Three meters were found destroyed in this way in different sections of the city from which they were taken. They were from 1 to 2 miles apart. The distance from the tracks of one was 300 ft., and of another 675 ft. All the meters were on side streets at right angles to the car tracks.

Conclusions and Remedies.

The conclusions reached by the paper and the remedies suggested are thus stated:

Coatings of various kinds of paint or varnishes will be of little use as an insulation, for it must be borne in mind that not only a moisture resistant is required, but an insulation that will resist continual moisture, and also that will stand the pressure of great weights. From laboratory experiments as well as observations in practice, we draw the following conclusions:

1. Steel structures are well preserved from ordinary corrosion by concrete if placed either in salt or fresh water. This, however, has long been known.

2. If but a small fraction of an ampere of electricity passes from an interior metallic column or structure into concrete or masonry as usually made, there will be corrosion of the metal and disintegration of the concrete or masonry.

3. Structures of steel in concrete that are subject to sea water are in more danger from electrolytic action than those in fresh water, by reason of the lower resistance of concrete in sea water as shown by the laboratory experiments.

4. In no sense can concrete be considered an insulator, and it is from all appearances just as good an electrolyte as any of the soils found in the earth.

"It is to be expected," says Mr. Knudson, "that so long as the single trolley with its grounded return is in general use, just so long may we look for electrolytic action in some form upon various underground structures; and reinforced concrete is no exception to the rule. It is not at all surprising that such currents are busy at steel work of bridge anchorages. Whether inclosed in concrete or masonry, these materials are no protection from the straying railroad current when the conditions are favorable for electrolytic action. In view, therefore, of the items here presented and of the enormous use to which concrete and hydraulic cements are now put, it would seem that this question should receive due consideration by those who have to do with planning and constructing important public works and buildings, as well as those who are entrusted with the care and safety of such structures."

The Engineering Societies Building.

A preliminary announcement has been made of the exercises which are to accompany the formal opening of the Engineering Societies Building in this city, which was given by Andrew Carnegie as a home of American engineering societies. The formal dedication will take place on the afternoon of April 16, followed by a general reception at the building in the evening. On Wednesday afternoon, April 17, there will be addresses by representatives of the founder, societies, the American Institute of Electrical Engineers, the American Society of Mechanical Engineers and the American Institute of Mining Engineers, all of whom are now installed in the building. There will also be greetings from sister societies and institutions and the presentation of medals.

On the afternoon of the 18th there will be a session of the American Institute of Mining Engineers, whose spring meeting will be held in New York at that time. H. T. Hildage will read a paper describing the excavation and tunnel work now being carried on in New York by the Pennsylvania Railroad. In the evening of the same day Gen. William Crozier will deliver an address on "The Ordnance Department as an Engineering Organization" before the American Society of Mechanical Engineers.

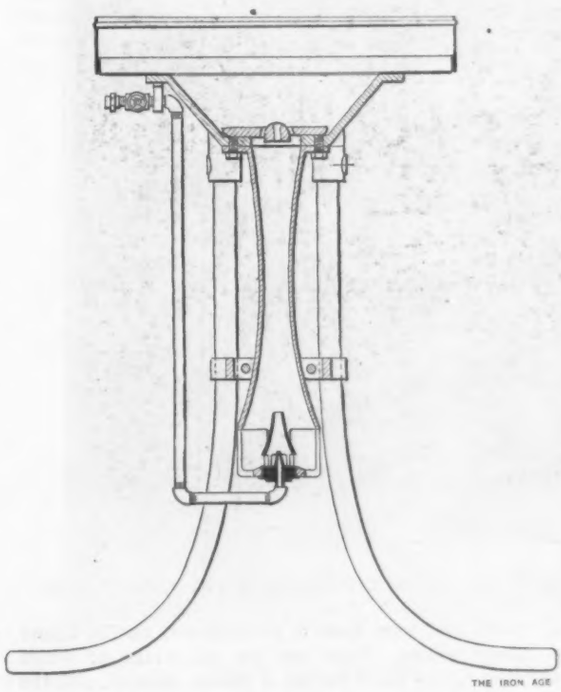
On Friday afternoon, April 19, there will be a professional session of the American Institute of Mining Engineers and in the evening an informal smoker for members of all the societies.

Belgian exports of steel rails in 1906 were 161,403 tons, compared with 133,425 tons in 1905; of girders, 100,635 tons, compared with 82,925 tons; of plates, 115,811 tons, compared with 120,246 tons. The imports of iron ore in 1906 were 3,540,485 tons, compared with 3,382,832 tons in 1905. The imports of coal were 5,350,584 tons, compared with 4,230,313 tons in 1905. The exports of coal were 4,974,416 tons, as compared with 4,704,-

063 tons in 1905. Coke imports in 1906 were 350,381 tons, compared with 356,136 tons in 1905; coke exports were 856,580 tons, compared with 977,095 tons; imports of briquettes, 137,467 tons last year, compared with 72,643 tons; briquette exports, 459,663 tons, compared with 480,247 tons.

An Improved Buffalo Compressed Air Forge.

In addition to the two new types of compressed air forges recently placed on the market, the Buffalo Forge Company, Buffalo, N. Y., has brought out another type, shown in the line drawing herewith. This new machine is listed as No. 22-C, and is particularly adapted for bridge and tank builders, railroad and car shops, boiler makers' and contractors' use. In the previous models a tiny jet of compressed air impinges on the blades of a fan wheel, causing it to revolve within a casing in such a way as to act as an ordinary centrifugal fan,



Section of the No. 22-C Compressed Air Forge Built by the Buffalo Forge Company.

drawing in through the inlet to the casing 40 times the volume of compressed air used and forcing it all to the tuyere. The economy of the new forge, No. 22C, is even better, as it takes only one-ninth the amount of compressed air to operate it.

This forge is radically different in design and employs no moving parts, consequently it requires no oiling or attention to keep it clean. Even the clinker falling through the tuyere drops to the ground of itself, so the wind box cannot become clogged. Compressed air from the shop system passes through a small globe valve and ¼-in. pipe to a one-piece vertical wind box directly beneath the bowl and tuyere. At the lower end of the wind box is placed a compound nozzle which works on the principle of an injector. A small jet of compressed air at high velocity through the nozzle carries with it and delivers to the tuyere ample air at moderate pressure.

The main features are the neatness of the design, which has no projecting parts; the light weight, making it readily portable and inexpensive to ship; the large capacity, as any desired intensity of blast may be secured, and the large tuyere bowl allowing a deep fire to be carried. Exclusive of hoods, the forge stands 2 ft. 9 in. high, the diameter of the bowl is 18 in. and the weight is 65 lb. The simple construction makes the cost to manufacture low, so that it may be sold at a moderate price.

Industrial Hygiene.

Improvement of working conditions for the operatives in manufacturing establishments has been a feature of the last decade. Precautions against accident have been taken, machines and elevators have been protected, and ventilating systems have been installed for keeping the air pure and removing objectionable fumes or dust. Just now exhibitions are being held in various cities where appliances for safeguarding the person and the health of employees are displayed. Important among the devices for improving atmospheric conditions in crowded, hot, dusty, ill smelling workrooms, or where the air is badly vitiated, is the fan blower. Although blowers are very generally installed in connection with heaters in mechanical ventilating and heating systems, they are not used locally where the vitiation is excessive as often as they should be.

In the metal working trades, for instance, there are frequently places where additional fans would be desirable. In brass foundries hoods may be introduced over the brass furnaces and ventilation secured with certainty by an exhaust fan, preferably of the inclosed centrifugal type, the disk or propeller type being only suitable for operating against slight resistances. The dust from rattling and tumbling barrels may be withdrawn by exhausting through hollow trunions or from housings built over the tumblers, and an exhaust system in connection with the sand blasting room will mean much to protecting the lungs of the workmen.

Wherever buffing, grinding and polishing processes are carried on there is the greatest need of keeping the atmosphere clear by using exhaust systems. The high speed of the wheel tends to set the fine particles of dust floating in the atmosphere. To prevent this each wheel is usually inclosed by a hood connected to a horizontal exhaust main and thence to the fan, each connection being provided with a blast gate.

The fan speed required for an exhausting system depends largely upon the material to be removed. With properly designed piping and hoods a vacuum of from 1 to 1½ oz. is usually sufficient; otherwise even a 4-oz. vacuum may not give satisfactory results. Hence it behooves one to accept the advice of those experienced in this class of work. Since the power required by a fan increases as the cube of its speed it is evident that a slight saving in initial cost of installation may be quickly absorbed in the added expense to operate the fan at unnecessarily high pressure. A fan at 4-oz. speed will require eight times the power necessary to operate it at 1-oz. speed. Many existing installations have been remodeled and larger fans installed, saving enough in operating expense to pay for the improvements in less than a year.

Smoke Inspection at St. Louis.—For nearly 15 years St. Louis has been active in the enforcement of smoke prevention measures, and the systematic work of its smoke inspection department has been bearing fruit. The report of the supervising engineer, John Kraus, for 1906 says that a marked improvement in smoke conditions was made in that year. The taking of steam from central heating stations has increased, and the introduction of gas engines and of electrical power has helped matters further. Mechanical stokers in use in St. Louis now number 800, and in addition are 400 automatic smoke preventing devices. The manufacturing plants at St. Louis have a total of 231,000 hp. in use, apart from heating plants. Careless handling of stokers is complained of in the report, which says: "A canvass of one of the manufacturing sections of the city shows that out of 24 plants equipped with mechanical stokers 3 were operated in such a manner as to entirely eliminate the smoke; 11 plants were doing fairly good work, while 10 were run apparently without any regard to the abatement of smoke. The operating engineers and firemen in these plants have been notified that unless their plants show a decided improvement, section 5 of the smoke ordinance, which makes the person having charge of the feeding or stoking of any steam boiler or furnace equipped with proper smoke preventing devices responsible, will be enforced."

Modern Equipment in Old Plants.

Molding Machine Development at the Foundry of the Falls Rivet & Machine Company.

BY H. M. LANE.

In these days of large new plants, high speed tools and other similar equipment we hear much concerning the advantages possessed by the modern plant with fireproof buildings, saw toothed roofs and other recent innovations. The owner of one of these up to date plants in a prominent manufacturing center is frequently surprised, however, to find that his competitor, occupying an old fashioned plant in a small town is able to meet his prices and even to underbid him and still make a profit. This fact suggests a study of some of the conditions which favor the small town location and the older construction, with, perhaps, occasional additions. Every dollar that is put into a plant, whether it be in tools, machines or buildings, represents a portion of the capital upon which it is necessary to produce dividends. If by availing itself of material on hand, the management can eliminate a portion of this expense the amount on which dividends must be paid can be correspondingly reduced.

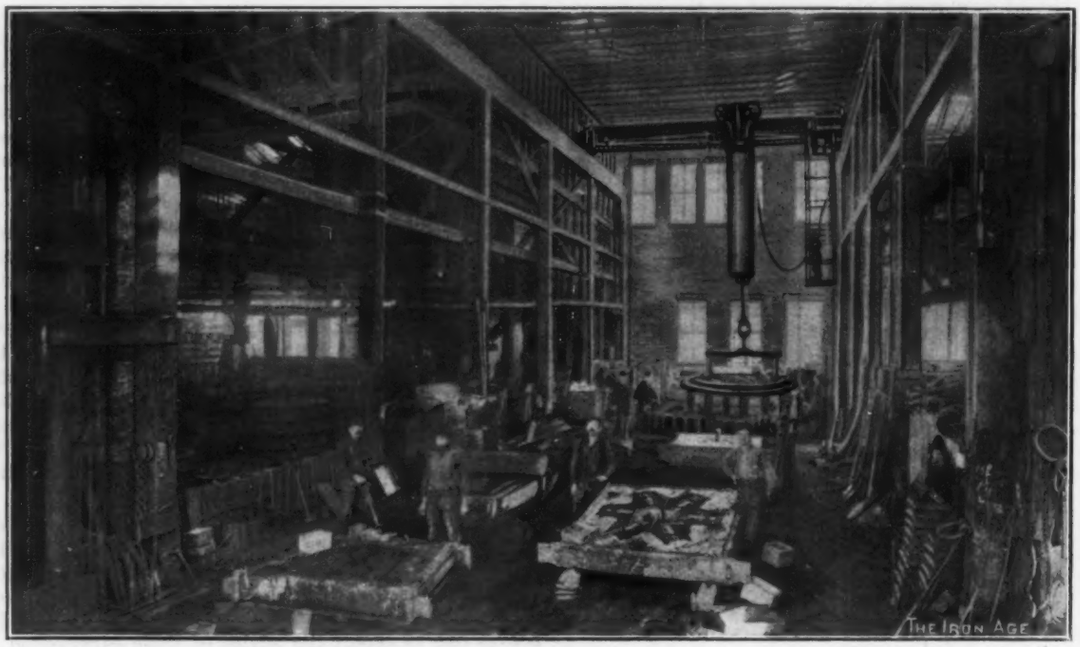


Fig. 1.—Main or Crane Floor of Falls Rivet & Machine Company's Foundry.—Pneumatic Traveling Crane with Timber Runway.

In addition to the above advantages which the small plants or plants in small towns have over large works in or near large cities are lower taxes, lower insurance rate, and as a rule less labor difficulty, because changes in shop force are fewer, many of the men owning their own homes and living in the immediate vicinity of the works. As living in the smaller towns is generally cheaper than in the large cities the men are contented with slightly lower wages.

Development of the Transmission Business.

The plant of the Falls Rivet & Machine Company, Cuyahoga Falls, Ohio, which serves to illustrate this article, belongs to the small town class. Originally started for the manufacture of rivets and rivet machinery the plant is now 33 years old, and has passed through several changes of ownership. The way the company became interested in the power transmission business serves to illustrate how manufacturers frequently drift from one line to another. The management came into the possession of a patent process for manufacturing pulleys which were pressed from steel and had a solid disk. This finally developed into the steel rimmed pulley business. With the development of the latter came also a demand for clutches for use in connection with electric light plants which were at that time just coming into existence. The pulley and clutch business necessitated the handling of other transmission machinery, such as shafting, hangers, bearings, gears, &c. This branch increased to such an extent that the works were finally divided and the rivet departments moved to another plant owned by the same company. Both were then located at Cuyahoga Falls, and were known, respectively, as the Upper and Lower works. Both had the advantage of water power, the Lower plant having a 210-hp. turbine, and the upper plant two 75-hp. turbines. There is a sufficient flow in the Cuyahoga River to make this hydraulic power available practically the entire year. The rivet works were destroyed by fire in 1906, and this portion of the business removed to Kent, Ohio, being located in the building formerly occupied by the Kearney & Foot File Company. The company is now under the management of Edwin Seedhouse, who has been connected with it for a number of years, and looks after the business end, leaving the factory end entirely to Mr. Wadsworth.

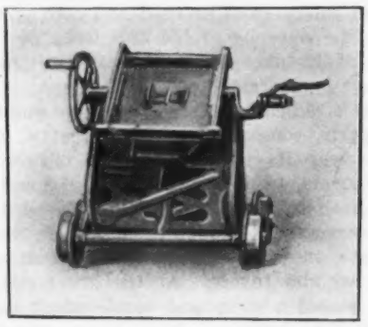


Fig. 2.—Teetor Match Plate Molding Machine.—Hand Wheel on the Left for Operating Mechanical Vibrator.—Pneumatic Vibrator on the Right.

One of the lines now representing a considerable portion of the output of the old Upper Works is the Wads-

worth core machine, which is manufactured in a number of different forms. George H. Wadsworth was formerly superintendent of this plant, and after bringing out the core machine went into business for himself, having machines made at Kent, Ohio. Later he returned as superintendent of the Cuyahoga Falls plant.

The buildings for the most part are of brick or hollow tile construction, and would in no sense be considered modern factory buildings. They nevertheless lend themselves very well indeed to the lines of manufacturing now carried on by the company. The foundry is located at one end and consists essentially of the main or crane floor, 30 x 110 ft., with cupolas located at one side, shown in Fig. 1. Adjoining the crane floor on one side there is the pulley molding machine floor, and back of the cupola the core department. Adjoining the crane floor on the opposite side are to be found the various bench and molding machine floors for different classes of transmission machinery.

Early Molding Machine Practice.

A very careful study has been made of each part manufactured to see how it could be constructed in the cheapest manner, and this has resulted in many interesting developments, especially in connection with molding machine practice. The Falls Rivet & Machine Company was one of the first companies in the country to adopt the molding machine, and for a great many years this portion of the foundry work was kept a profound secret. One of the first installations, which was of the match plate type, was the Teetor machine, Fig. 2. This was originally equipped with a mechanical vibrator, which consisted of a hand wheel with an internal ratchet connected with a pawl. By giving the wheel a quick revolution the pattern was vibrated by motion transmitted to it from the pawl. This, however, was not satisfactory and hence a mechanical vibrator was attached to the pattern plate and operated by compressed air. This vibrator was of the company's own make and has been in use for a great many years.

An attempt was early made to place the heavy hangers on the molding machine, and Fig. 3 shows a pair of stripping plate Tabor machines fitted up for this purpose. Originally these machines traveled on a track, so that they could alternately be run under a large press, which was supposed to do the ramming. The idea was that one machine could be under the press while the other was having a flask removed, a new one substituted and the sand introduced. Both machines are of the stripping plate type, and it is interesting to note that the caps for the hangers were mounted on the same plate upon which hangers themselves are mounted. There are two objections to this practice: First, if either the hanger or cap turns out bad it is impracticable to make a separate piece to match it upon the machine in question, for it would be difficult to stop off the one portion of the large mold, which would ordinarily make both pieces. Second, these machines use large rectangular flasks, which contain a large amount of sand and are exceedingly heavy to handle. Greater economy has been obtained in the later machines by mounting the hangers upon one machine and the caps on another.

The large press which served for ramming the molds upon the Tabor stripping plate machine was abandoned because the percentage of loss was exceedingly great, amounting to 20 per cent. or more. When hand ramming was resorted to this loss was easily reduced to approximately 6 per cent.

Combination Vibrator and Stripping Plate.

The hangers are now molded by a combination vibrator and stripping plate arrangement, shown in Fig. 4, the pattern and a portion of the pattern plate being mounted on a heavy bar to which the vibrator is attached. The foot of the hanger only is stripped. This is necessary on account of the fact that no draft whatever can be allowed on the bottom of the hangers, as in modern practice hangers have to be attached to structural steelwork, and if a draft were allowed on the pattern the bottom of all of the hangers would have to be machined. By stripping only the base of the hanger it is possible to make a very much cheaper pattern and pattern plate than where the entire pattern is stripped, as in the older style of machines. These hangers are also molded on Tabor drop pattern machines, two machines being necessary for each pattern, one making copes and the other drags.

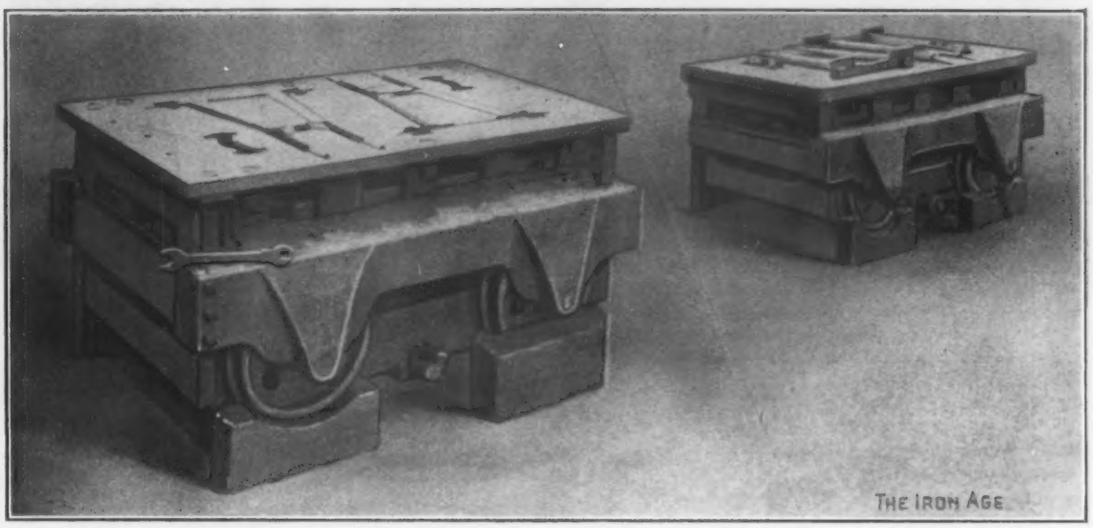


Fig. 3.—A Pair of Tabor Stripping Plate Molding Machines, with Full Stripping Plates for Hanger and Cap.

Heavy First Cost of Patterns.

When this new style of mounting was adopted a large portion of the equipment was being made by hand, and it was decided that it would be cheaper to produce this by machine. The cost of equipping two machines of the Tabor drop pattern type for the production of 72 different styles of hangers was more than three times the original cost of the machines, which serves to illustrate the fact that the first cost of molding machines is often small compared with the cost of equipping them with patterns. These patterns, however, could be equipped for about 25 per cent. of the cost, which would have been incurred had the machines been of the full stripping plate type, as in the case of the older installation. In other words, by simply stripping the foot and depending upon vibrating the balance of the pattern a decided saving has been made. While, as already stated, the percentage of loss on the old machines under power ramming ran in the neighborhood of 25 per cent., and was reduced to 6 per cent. by hand ramming, the new drop pattern machines produce work at a loss of between 3 and 5 per cent. when operated by handy men.

Where Hand Molding is Cheaper.

From these facts one would be liable to jump to the conclusion that molding machines should be used in all cases. This company, however, has demonstrated conclusively that there are cases where castings can be produced far cheaper by other means. For instance: All of the smaller journal boxes are molded on small Tabor power ramming machines, which give exceedingly good results where the depth of the pattern is not great. The larger sizes are produced by the use of heavy match boards, one pair of which is illustrated in Fig. 5. These molds are made by hand, the flasks being rolled over and the match boards drawn in the usual manner. The expense of putting these caps on a stripping plate machine would be great, and with the number necessary the interest on the additional investment for the more expensive equipment, both for machines and plates, would more than counterbalance the small saving.

The screws for the Wadsworth core machine are another interesting example. These are molded by hand, four in a flask, the pattern being turned or screwed out by hand, and the molds produced far cheaper than they could be by the use of special molding machine, even though they are turned out in large quantities. All of the molds made with these match boards, or special patterns, are produced by handy men, who have been broken in on certain classes of work only.

Economies in Retaining Existing Plant.

The handling devices in use, not only in the foundry, but all through this shop, also serve to illustrate how a study of existing conditions may result in the adoption of equipment permitting a much cheaper cost of production than would be possible by tearing down the old plant and replacing it with a more costly structure.

In the main or crane bay of the foundry is a traveling crane, traversed by power and provided with a direct lifted pneumatic hoist. This hoist is quick in action and has been found exceedingly serviceable. It has been installed for 18 years and has been through one serious fire. It happened that the crane was run to the west end of the foundry before the fire started, and after the fire there it stood on the charred timbers of the old wooden crane runway. The east end of the foundry was rebuilt, the old timber supporting the crane was strengthened, and it was then run on the new timbers, where it was inspected. An inspection revealed the fact that the only injury was to one wheel, which had been cracked by the heat. The cylinder was not taken down, nor any part of the crane dismantled at the time, and when some years later the crane was taken down to install a new piston the cup leather packing in the piston was found to be in good condition, showing that the heat had not penetrated the cylinder sufficiently to destroy it. This portion of the foundry is now protected from fire by a large number of hose reels, provided with automatic starting valves, which turn on the water when the last of the hose is drawn off the reel.

Fig. 4.—Two Drop Pattern Machines for Stripping Hanger Foot and Vibrating the Balance of Pattern.

Trolley System.

A trolley system, shown in Fig. 6, is arranged to carry the iron from the cupola to either the pulley molding machine floors or to the other molding machines or to benchwork floors. The ladles of iron are delivered at the ends of the floors next to the trolley system. All the heavier floors are provided with light overhead traveling cranes of from 1000 to 3000 lb. capacity, the pouring being accomplished with the aid of these cranes. The benchwork and lighter molding machine floors are poured with bull ladles. The trolley system was designed and installed over 20 years ago and has given thorough satistion.

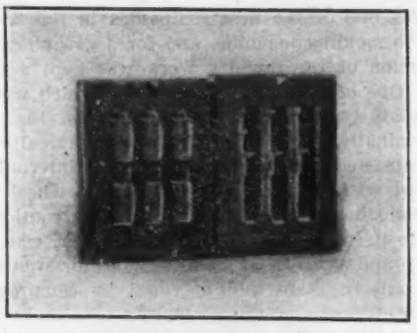


Fig. 5.—Match Board for Large Hanger Caps.

Advantageous Foundry Methods.

Many interesting little devices have been developed in connection with the foundry work. For instance, iron flasks are used in connection with power ramming machines and are clamped by means of small iron clamps driven over taper lugs on the ends of the flasks. For

molding the hangers in connection with the molding machines, which have been fitted up recently, flasks of special design, which economize as much as possible in the amount of sand used, have been adopted. These are also clamped by small iron clamps, fitting the lugs at the ends of the molds.

In molding the larger sizes of pulleys and pulley rings on the main crane floor of the foundry one very interesting method has been developed. These pulleys are molded by the use of standard 24-in. rings, which are drawn up by the crane as the ramming proceeds and the molds are cast open. This enables the molder to inspect his mold immediately before the metal enters it, and also provides a continuous riser all the way around the pulley rim, in which the dirt is allowed to collect. This insures a sound, clean rim for the portion that is to be used. The riser edge of the rim is cut off and returned to the cupola to be remelted.

Transit of Work Through the Shop.

The balance of the plant contains a number of features of interest. The work passes from department to department under a system, each unit of which is suited to the particular work to be done in that department. The cleaning of the heavy casting is done at one end of the main crane floor under the heavy traveling crane. These castings are then put on a transfer car, which takes them direct to the large boring mill or to the machine shop. Each of the heavier machines is served with a swinging jib crane, a section of trolley hoist, or a small traveling crane. By this system the handling appliances are so arranged that one unit is never in the way of the rest of the system, and if a sufficient amount of work is placed within the radius of the crane over any given machine it can operate continuously without regard to the rest of the plant.

The erecting floor has been placed at one side of the machine shop, so that the heavier castings are brought on to the floor by a cross transfer car. This department is provided with a 10-ton pneumatic traveling crane. The crane runway, however, is of timber and is independent of the rest of the building. The erecting shop is a lean-to, which has been constructed next to the original main shop building. The other departments have been specialized, so far as possible. The smaller pulleys are all turned on one floor or in one department, the boxes or bearings and the hangers are fitted up in another department, and the core machines are constructed and assembled in still another department. Each of these departments has been equipped with a full line of modern machinery and arranged so as to handle the work as economically as possible.

One of the most difficult problems confronting the management was the heating of these old style buildings. This has been successfully accomplished by the introduction of the indirect hot air system, the air pipes being located overhead and provided with suitable openings, some of which are near the top of the room and others piped to the bench level.

The present officers of the Falls Rivet & Machine Company are Edwin Seedhouse, president and manager; Charles H. Wells, treasurer; C. A. Weidner, purchasing agent; George H. Wadsworth, superintendent.

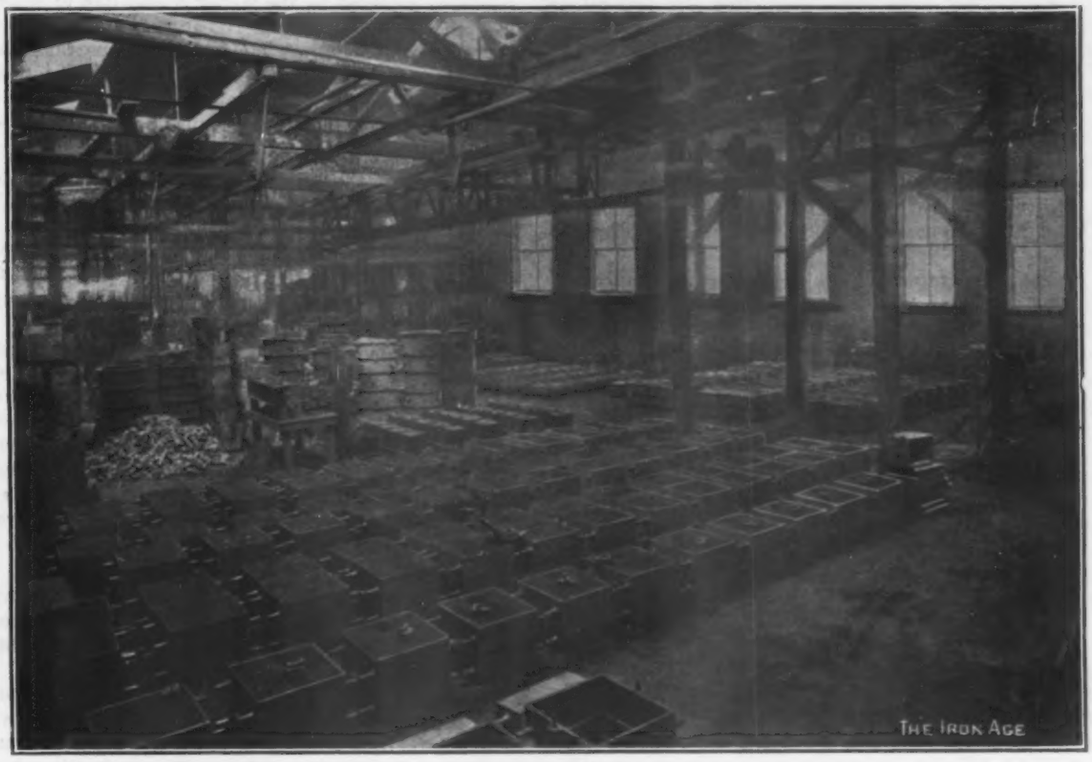


Fig. 6.—Power Ramming Molding Machine Floors, Commanded by Trolley System and Traveling Cranes.—Special Flasks and Clamps Are Shown.

The Retort Coke Oven Company, Cleveland, Ohio, manufacturer of by-product coke, which it furnishes to the Cleveland Furnace Company's blast furnace adjoining its plant, is building a new battery of 20 ovens of the Rothberg type, in addition to the two batteries of 40 ovens, each of which have been in operation since February 23, 1905. These ovens have proved efficient as to strength, even heat and distribution and regulation, and are producing high grade metallurgical coke. In two years of steady running the repairs on ovens have been practically nil. The Retort Coke Oven Company has also started to increase its condensing capacity by adding new apparatus, located in a building adjoining the present condensing house. The Coal & By-Products Company, with offices in the Farmers Bank Building, Pittsburgh, is building the Rothberg oven.

Government finances are in very satisfactory shape, a comfortable surplus over expenditures being shown every month. The February excess of revenue was $8,205,180, and for the eight months of the fiscal year then ended the excess of revenue was $40,666,348, as compared with an excess of only $1,101,304 for the corresponding period of 1906 and a deficit of $35,450,768 for the corresponding period of 1905. The turning point in the national finances was reached in February of last year.

High Speed Tool Steel.*

BY H. C. H. CARPENTER, MANCHESTER, ENGLAND.

The history of the evolution of the art of cutting metals during the last 26 years, set forth by Mr. Taylor, has appealed to the writer with special interest. It is one of the comparatively rare instances in which results of the highest importance have been reached only after long years of patient grappling with difficulties of the most intricate and baffling character and in which the number of independent variables has bewildered the most powerful intellects. This quality places it among those types of research whose problems are only solved by the "patient intending of the mind."

Mr. Taylor has courteously referred, and indeed given great prominence, to two investigations of the writer's which bear upon the art of cutting metals, and the latter would like to take this opportunity of expressing his gratification both for the value attached to them by so eminent an authority, and for the substantial correctness with which they have been interpreted. A few minor corrections are, however, necessary, and these will be dealt with at once.

Corrections.

a. "Cementite" is said to be the technical term for hardening carbon. This is not correct. The technical name for the structure of steels containing hardening carbon is either "martensite" or "hardenite." Cementite, although a hard carbide of iron (Fe_3C), occurs in softened steels containing more than 0.90 per cent. of carbon.

b. The temperature at which hardening changes to softening carbon on cooling is stated to be 760 degrees C. This is rather too high for most steels. For pure carbon steels it is about 700 to 720 degrees C. For special steels—*e.g.*, the chromium or chromium tungsten steels—it varies between about 710 to 760 degrees.

c. Mr. Taylor's reading of the significance of the changes of slope of the curves in reference to critical changes is correct. But within wide limits the general character of the curves is independent of the rapidity with which the heating and cooling takes place, and this is one of the chief advantages of the differential over the direct method of taking such curves. In the former method the alloy is cooled against a neutral metal or alloy which is known to give a smooth cooling curve; in the latter the alloy is cooled against time. The former, in addition to being much more sensitive, is also more philosophical.

d. The writer does not agree with Mr. Taylor's statement as to the inferiority of Dr. Matthews' steel as compared with recognized high speed steels in the cutting tests. Although the former did not stand up to its work in machining hard steel, it behaved extremely well in cutting medium hard steel, and on the whole, satisfactorily in machining soft steel. It was tested under less advantageous conditions than the tools in the Manchester tests. And it seems fairer to suspend judgment unless further tests are made.

e. Reference must be made to the following quotation from Mr. Taylor's address: "Our original investigations showed that red hardness was seriously impaired by heating tools above 1200 degrees F. (650 degrees C.), and that the quality of red hardness was entirely removed by heating them up to 3150 degrees F. (730 degrees C.). Now it will be noted that neither in the heating nor cooling curves shown by Professor Carpenter any critical point is shown at these temperatures which are the critical temperatures so far as we know for high speed steels, and therefore the critical temperatures affecting red hardness." The heating, but not the cooling, curves bear on this point. Alloy No. 14 shows no break in the curve, but alloy No. 16, previously cooled from 1200 degrees C., shows a change of slope at about 622 degrees, which is continued until 735 degrees C. This is almost exactly the range referred to by Mr. Taylor. And if the other curves in the paper (*Journal* of the Iron and Steel Institute, 1905) are consulted it will be noticed that some of them give similar breaks. Accordingly, it is the writer's view that the curves are more in agreement with the results of practical tests than Mr. Taylor has given them credit for.

Red Hardness.

Before discussing a few of the extremely interesting issues raised in the address, it appears desirable to take note of the following important conclusion arrived at by Mr. Taylor: "All of these facts indicate clearly that the methods as yet devised by scientists for determining the most important quality (*i. e.*, red hardness) in the new high speed steels are ineffective." When such a statement is made with a wealth of practical experience and experimental results behind it, the safest course is to accept it without demur. Probably no one who studies this research will challenge Mr. Taylor's conclusion that the only reliable guide or index to the behavior of cutting tools hitherto devised consists in making standard cutting speed tests. But as one of the scientists referred to, the writer would like to state that his aim in undertaking researches and contributing papers in the field was far less ambitious than that of supplying a simple and reliable index to the property of red hardness, being initially an attempt to arrive at the rationale of the heat treatment of high speed tool steels in current use.

A point of the utmost importance is the distinction drawn by Mr. Taylor between hardness and red hardness. This point is labored with considerable emphasis in various passages, but the following quotation will suffice to define his position: "He"—*i. e.*, the writer—"has failed to recognize the existence of red hardness as a property of these steels entirely independent of hardness. We would again call attention to the fact that the highest degree of red hardness can be found in these high speed steels when accompanied either by the highest degree of hardness on the one hand or by a very considerable degree of softness on the other hand." If the writer has understood Mr. Taylor correctly, he draws a sharp distinction between the hardness in virtue of which a tool cuts at the ordinary or comparatively low temperature and the hardness in virtue of which a high speed steel cuts at a red heat (red hardness).

This may be true, but the following considerations appear to indicate that the facts observed and recorded by Mr. Taylor and his coexperimenters can also be explained without assuming a difference of property. The writer is well aware that the simplest explanation is not always the true one, but until it has been shown to be wrong there is no need to have recourse to a complex one involving rash assumptions. Time unfortunately prevents him from developing the explanation to the extent it really requires to bring it into line with the numerous facts marshalled by Mr. Taylor in support of his view, but the following general exposition may be sufficient to enable application to be made to particular cases:

The Structure of Steel.

The relations between carbon and iron must first be considered. The most complete state of mutual solution of these elements appears to correspond to austenite (white polyhedra); the next, to martensite (acicular structure); the next, to the varieties of sorbite (almost structureless), and the least, to pearlite (banded structure). In practice pure austenite has never been obtained. The method adopted for keeping the elements in solution—namely, quenching in various media—is not sufficiently rapid to prevent some of the carbon (in what form is immaterial) from separating, and the result is a mixture of austenite and martensite. In pure carbon tool steels the hardening is carried out in such a way that as far as possible the iron and carbon are in the form of martensite. This is the hardest modification obtainable. If an attempt is made to cut work at a high speed with such a tool it fails, because the martensite changes rapidly at 200 to 300 degrees C. into the sorbite varieties, and ultimately into pearlite, which are all soft.

But the addition of tungsten and chromium in the

* Contribution to the discussion of Fred W. Taylor's Presidential Address to the American Society of Mechanical Engineers, December, 1906. Reprinted from the March number of the *Proceedings*.

proportions present in high speed steels enables the complete solution of iron and carbon to be maintained by rapid cooling from 1200 degrees C. below 620 degrees C. (1150 degrees F.), and the result is that such steels, as treated for cutting, possess the austenitic structure. As Mr. Taylor points out, the steels in this condition can readily be filed by ordinary hardened tool steel. The reason for this is well known—namely, that austenite can be indented by martensite.

The Heat at Which Tools Cut Best.

What happens when these high speed austenitic tools are put to cut work? The best of them are unaffected by temperatures not exceeding 500 to 550 degrees C., the reason being that the chromium and tungsten combined prevent the complete drawing of the temper which takes place in pure carbon steels. Somewhere about 600 degrees C. the austenitic changes to the martensitic structure. This is the red heat at which the tools cut best. At higher temperatures the martensitic is replaced by softer materials and the tools break down. According to this explanation, the high speed steel possesses at about 550 to 600 degrees C. the same hardness that the pure carbon steel possesses at ordinary temperatures. And no distinction seems necessary other than that the hardness is manifested at different temperatures. The hardness itself is the same in the two cases.

There is one weak spot in this explanation—namely, the writer has examined cases in which no martensitic structure appeared to be formed from the austenitic structure. Either the tempering proceeded on other lines or the martensite stage was missed. Accordingly he does not wish to press the above exposition, but rather to suggest it as a possible co-ordination of the facts recorded by Mr. Taylor.

It has the merit of offering an explanation of the curious fact mentioned, that "if the percentage of tungsten is increased much beyond 19 per cent., even although the chromium is also increased in quantity, the tool diminishes in red hardness." It is well known, through the work of M. L. Guillet, that the alloy steels with austenitic structure vary considerably in the ease with which they pass into the martensitic stage, and indeed that some of them do not pass at all, and it appears to the writer that the No. 14 tool containing 24.64 per cent. of tungsten and 7.02 per cent. of chromium, may be one of these, in which case the reason for its inferiority of cutting properties is clear—namely, because the martensitic (*i. e.*, hardest structure) is never formed.

Other Hardening Agents than Carbon.

Mr. Taylor's statement that the red hardness of high speed steels is practically independent of carbon between the limits of 0.32 and 1.28 per cent. is a fresh piece of the kind of evidence that has been accumulating during recent years that carbon can no longer enjoy the unique position as a hardening agent it has been hitherto supposed to possess. It follows clearly from his experiments that in high speed steels the capacity to cut work at a red heat results from a combination of variables, more especially carbon, chromium and tungsten, in which it is impossible to assign a more important function to one variable than to any of the others.

This leads up to what the writer regards as the most baffling question that arises out of that section of the address entitled "Investigations made to find an explanation or theory for the phenomena connected with chromium tungsten tool steels,"—namely, what is the part played by chromium in high speed steels? As a result of the first of his researches quoted by Mr. Taylor (*Journal* of the Iron and Steel Institute, 1905, pages 433 to 473), the writer was enabled to conclude that the rationale of the advantageous presence of tungsten in these steels is fairly evident—namely, that its action consisted in altogether preventing under suitably chosen conditions changes in iron carbon alloys which would have for their result the softening of the material and its consequent unfitness for use; and, further, that it imparts to such steels a high resistance to tempering. On the other hand, it was shown that chromium not only does not retard, but actually hastens the conversion of hardening to softening carbon on cooling, and the microscopic evidence was all against the hypothesis of special chromium carbides or double carbides. In other words, the action of chromium was shown to be the opposite to that of tungsten. The question naturally presents itself, "What is the part played by an element which by itself appears to act in a direction diametrically opposite to that desired?"

The Action of Chromium and Tungsten.

In formulating the view that chromium and tungsten differ fundamentally in their action, the writer found himself in opposition to the current view—namely, that chromium and tungsten acted similarly. The peculiar action of chromium is, however, now recognized by Mr. Taylor. He shows that the Mushet self-hardening steels (1894 to 1900) which contained tungsten, manganese and silicon as their principal alloy elements, were different from the present day high speed steels containing tungsten and chromium (tungsten and manganese both act as retarders of critical changes—*i. e.*, similarly): and he emphasizes the difference between chromium and manganese in the passage, "Chromium is the element which in combination with tungsten produces the new quality of red hardness and not manganese." The distinction between the actions of chromium and tungsten is drawn in the passage "A tool without chromium or with very low chromium, even though there is a proper percentage of tungsten present, does not produce a high speed steel even though the manganese be very low or very high."

The writer's attempt to co-ordinate hardness and red hardness in preceding paragraphs permits of application to the present question, as Mr. Taylor shows that even high tungsten steels are not high speed steels. Let it be supposed that these are austenitic steels of the nontransformable type (in which case they will not exhibit red hardness). Now let chromium be introduced. Its tendency will be to convert such steels into transformable ones, because it has been shown to hasten the conversion of hardening carbon. In small quantities its influence may be insufficient to bring about the change, but it may be that in considerable quantity (such as the 5 to 6 per cent. mentioned by Mr. Taylor) it will cause the change from austenitic to martensitic structure at about 550 to 600 degrees C. The result will be a high speed steel possessing red hardness. This view can readily be put to the test of experiment, and the writer hopes to undertake this soon.

Scientific Classification of Types of Cutting Tools.

It appears possible to put forward now a scientific classification of the various types of cutting tools. Mr. Taylor groups them historically under three main heads, which will serve quite well for the writer's grouping, viz.:

a. The era of carbon tools (up to 1894).

b. The era of Mushet or self-hardening tools (1894 to 1900).

c. The era of high speed steels (1900 up to the present time).

Group *a* represents tools which, in virtue of the treatment to which they are exposed, exhibit maximum hardness at the ordinary temperature. They are martensitic steels. Run at about 200 degrees C. they soften, because at this temperature the martensite changes into sorbite and ultimately pearlite. The rate of change is at a maximum in these steels.

Group *b* also represents similar tools of martensitic structure, but the tungsten retards the rate of change of the martensitic constituent, and hence they can be used at higher temperatures than those in group *a*. Such tools, however, cannot be run at temperatures much exceeding 300 to 400 degrees C.

Group *c* includes tools which, after heat treatment, do not exhibit maximum hardness at the ordinary temperature. Their structure is austenitic; they can be filed by the tools classified in groups *a* and *b*. In virtue more particularly of their chromium contents the change from austenitic to martensitic structure takes place at temperatures between 550 and 650 degrees C., and consequently the tools possess maximum cutting hardness

at these temperatures. This is the explanation of their characteristic property of red hardness.

The Question of Maximum Temperature.

There is no reason for supposing that group *c* represents the final word in regard to the maximum temperature at which high speed steels can be run. On the contrary, Mr. Taylor's address contains internal evidence that his latest tools can be run at higher temperatures than had been previously reached. A particular combination of chromium and tungsten or other elements may enable the temperature to be pushed up to 700 degrees C. M. H. Le Chatelier has advanced sound theoretical reasons for supposing (at any rate as long as carbon forms an integral part of tool steel) that this temperature cannot be exceeded, because the rate of change is a maximum at 750 degrees or thereabouts.

It may be very difficult to make this advance, and the writer is inclined to agree with what he takes to be Mr. Taylor's forecast of the economic future of this industry—namely, that it will probably pay better to produce tools from cheaper materials than those now used that will run at the present degree of temperature than to experiment with costly alloys that may be found to work at rather higher temperatures.

Naval Construction Plans.

WASHINGTON, D. C., March 12, 1907.—It is announced at the Navy Department that proposals for the construction of the two battleships authorized by the appropriation act just passed by Congress will be advertised for about May 1, at which date the detailed plans and specifications will be available. At about the same time bids will also be solicited for the two torpedo boat destroyers authorized by the same act.

The New Vessels Authorized.

The legislation authorizing the two battleships has been somewhat peculiar. In the naval appropriation bill passed a year ago one vessel was authorized, but it was stipulated that before advertising for proposals the Secretary of the Navy should submit to Congress the plans of the ship. Early in the present year these plans were communicated to both houses under seal, but their chief characteristics have since been made known. In the appropriation act just passed, as construed by the Navy Department, these plans are approved and a second vessel of the same type is authorized, as follows:

That, for the purpose of further increasing the naval establishment of the United States, the President is hereby authorized to have constructed, by contract or in navy yards, as hereinafter provided, one first-class battleship to cost, exclusive of armor and armament, not exceeding $6,000,000, similar in all essential characteristics, and additional, to the battleship authorized by the act making appropriations for the naval service for the fiscal year ending June 30, 1907, plans and specifications for which last named vessel have already been prepared and submitted by the Secretary of the Navy for the information of Congress, as required by the provisions of the aforesaid act.

The question has been raised as to whether the above provision actually authorizes the construction of the battleship included in the appropriation act for the fiscal year 1907. No other enactment of Congress refers in any way to the first of the two big ships, however, and the Dement feels justified in construing the phrase "and additional to," in connection with the acknowledgment of the receipt of the Department's plans and specifications, as a complete authorization.

Characteristics of the New Battleships.

The chief characteristics of the two battleships, which are to surpass in size and power any vessels ever constructed for the navy, are as follows:

Length on load water line, 510 ft.; length over all, 518 ft. 9 in.; beam molded on load water line, 84 ft. 10¼ in.; beam over all, 85 ft. 2⅜ in.; displacement trial, 20,000 tons; displacement fully equipped and manned (everything on board, full), 22,075 tons; draft, mean (trial displacement), 27 ft.; draft, mean, fully equipped and manned (everything on board, full), 29 ft. 5 in.

Armament, main battery: 10 12-in. B. L. R., 45 calibers; two submerged torpedo tubes. The 10 12-in. B. L. R. are mounted in five electrically controlled turrets on the center line, placed as follows: Two forward above the forecastle deck, the second one firing over the top of the first; two aft on the main deck on the same level, and one amidships firing over the two after turrets. The two torpedo tubes will be located forward below the water line.

Secondary battery: 14 5-in. R. F. G.; 4 3-pounder saluting guns; 4 1-pounder semiauto guns; 2 3-in. field pieces; 2 machine guns, 30 calibers. The 5-in. guns are located on the gun deck, forming two broadside batteries of seven guns each, the corner guns having head and stern fire, respectively. The smaller guns are located in commanding positions with large unobstructed arcs of fire.

The appropriation act also provides for two torpedo boat destroyers to have the highest practicable speed and to cost, exclusive of armament, not to exceed $800,000 each, and also increases to the same sum the appropriation for the three torpedo boat destroyers provided for in last year's naval appropriation act. The Bureau of Steam Engineering is preparing a series of alternative plans for the motive power of these torpedo boat destroyers, one of which will be equipped with turbine engines. It is probable that bidders will be invited to submit figures on both reciprocating and turbine engines for both vessels.

Contract Conditions.

After considerable controversy between the House and Senate the following provisions, among others, were inserted in the appropriation act governing the awarding of contracts for the construction of the two battleships and the two torpedo boat destroyers:

And the contract for the construction of said vessels shall be awarded by the Secretary of the Navy to the lowest best responsible bidder, having in view the best results and most expeditious delivery. . . . All said vessels . . . in all their parts shall be of domestic manufacture; the steel material shall be of domestic manufacture, and of the quality and characteristics best adapted to the various purposes for which it may be used, in accordance with specifications approved by the Secretary of the Navy. . . . Not more than one battleship and one torpedo boat destroyer, or two torpedo boat destroyers, shall be built by one contracting party: Provided, That the Secretary of the Navy may build any or all of the vessels herein authorized in such navy yards as he may designate, and shall build any of the vessels herein authorized in such navy yards as he may designate should it reasonably appear that the persons, firms or corporations, or the agents thereof, bidding for the construction of any of said vessels, have entered into any combination, agreement or understanding the effect, object or purpose of which is to deprive the Government of fair, open and unrestricted competition in letting contracts for the construction of any of said vessels.

Congress also amended the provision with regard to submarines authorized by the naval appropriation act passed a year ago, so as to extend the test period until May 29, 1907, increasing the limit of cost $3,000,000, but no part of the appropriation to be expended for any boat that does not in such test prove to be equal in the judgment of the Secretary of the Navy to the best boat now owned by the United States or under contract therefor.

The Plans Will Not Be Delayed.

There is no basis for the reports current in the daily press to the effect that the Department will be unable to carry out the programme authorized by Congress because of the reduction in the allotment for armor and armament in the bill as finally passed. The Senate adopted the estimate of the Navy Department and fixed the sum at $12,000,000 but the House cut this down to $10,000,000 and refused to increase this figure. The estimate submitted by the Department represented a very close calculation and the entire $12,000,000 will be needed before the end of the fiscal year beginning July 1, next. The Secretary of the Navy has decided, however, that the plans already formulated shall be carried out and as soon as Congress meets in December a deficiency appropriation of $2,000,000 will be requested with the understanding that it shall be made immediately available. W. L. C.

"The Deoxidation of Bronze and Bronze Alloys by Means of Magnesium" is the title of a monograph recently sent out by C. W. Leavitt & Co., 220 Broadway, New York, which will doubtless be of interest to founders of brass and bronze alloys.

The Bush Model Factories.

The second of the 18 model factory buildings to be erected by the Bush Terminal Company along the water front in Brooklyn, N. Y., from Thirty-ninth to Fifty-first street, has been completed and work on other structures of the kind is under way, with a view to carrying out as expeditiously as possible the company's plan of establishing modern manufacturing facilities for companies that for one reason or another wish to rent rather than own their manufacturing plants.

The Bush Terminal enterprise is a novel one in its way and its factory proposition is the biggest thing of the kind ever attempted. The company has 120 acres of water front property, on which it has already established 123 warehouses, all of fireproof construction, and ranging from one to seven stories high. These warehouses have been in operation for some time, and have shipping facilities, both by rail and water. The Bush Terminal Railroad connects all of the company's property and has a freight yard capable of holding 1000 cars. The terminal line is connected with the Pennsylvania Railroad's terminal, and there are six large piers along the water front, each 1400 ft. long and 75 ft. wide, with 150 ft. between piers. There are two railroad tracks of the terminal branch system extending along each of the piers, and the branch lines form a network through the company's entire property, connecting the present factories and factory sites with the freight yard, warehouses and piers.

The two factory buildings now completed, which will be practically duplicated by the 16 other structures to be built, are model manufacturing plants in every respect, and the system of renting adopted by the Bush Terminal Company is suggestive of the manner in which sectional book cases are used. Under the company's system a small manufacturer can obtain a limited amount of floor space, and get just as good service in the way of freight deliveries and power facilities as a large concern that engages a number of floors, the plan being to rent space in the structures with the agreement on the part of the Bush Terminal Company to handle all incoming and outgoing shipments of its tenants between the car or vessel and the loft of the manufacturer.

The building just finished, which differs but slightly from the first building erected, is 75 x 600 ft. in size and six stories high. The structure is built of reinforced concrete, and is calculated to support about 800 lb. to the square foot. Each floor contains 45 sq. ft. of space and is divided into three bays of 25 ft. each, with two rows of columns on a floor. The building is served by eight electric elevators and has direct track connections, the railroad tracks passing along the side of the structure. Trucking platforms are provided on the other side of the building, and there is a power station in each factory furnishing electric light and power and live steam for manufacturing purposes to tenants at rates based on the consumption.

The building is protected from fire by a sprinkler system of the automatic type, for which pressure is supplied by an elevated tank about 150 ft. high and capable of holding 100,000 gal. The sprinkler heads will operate at a certain temperature, so that a fire will be checked should it occur in a deserted portion of the building, and at the same time an alarm indicates in the power plant the location of the fire, so that the fire crew, maintained by the company, can reach the point of danger in short order.

While some minor alterations may be made in the structures that will subsequently be built, they will on the whole be duplicates of the building here described, and their general appearance will be the same as the two completed structures, a view of which is shown in the accompanying illustration. It will be seen that the first building is faced with brick and stone for appearance sake, but the rear structures will all be of concrete finish.

An original feature of the construction of the buildings already erected is the character of the columns. These are built of ringed sections of concrete, reinforced by continuous steel spirals from top to bottom, which lends great strength to the construction. The sections are stacked one on another much after the manner of a pile of cheese boxes, and are filled with concrete as they stand in position. In this way the sleeve of reinforced concrete serves as the form for the molding of the column and, of course, is left in position.

The First Two of the Eighteen Model Factory Buildings Which Will Be Erected by the Bush Terminal Company, Brooklyn, N. Y.

The Rusting of Iron.—British technical journals refer to the researches to determine the causes of rusting in iron, in progress for several years at the Central Technical College, South Kensington, England. An article by Dr. Gerald Moody reviewing the work thus carried on, says that this conclusion has been reached: "That rusting is a consequence of two separate processes. The first change, probably electrolytic, is the attack of the metal by carbonic acid, resulting in the formation of a ferrous salt. This ferrous salt subsequently undergoes more or less complete oxidation." The view held for some time has beeu that rust is due to the interaction of iron, oxygen and water, leading to the formation of hydrogen peroxide, and, therefore, that rust could be formed where carbonic acid is entirely excluded. This latter view in turn displaced the conclusion reached by Crum Brown and published in 1888—that rust is due to the intervention of carbonic acid—the compound of iron and carbon first formed being afterward decomposed by oxygen, leading to the production of ferric oxide.

Chilled Cast Iron Car Wheels.*

A Canadian Tribute to Their Efficiency.

BY W. E. FOWLER.

The chilled cast iron car wheel would appear to be a product peculiar to this continent. I believe its birthplace was here, and certainly its home is with the American and particularly the North American railroads. I do not think it would be untrue to say that without it the immense mileage attained by railroads on this continent would not have been possible. It certainly is true that it has been a great factor in the economical operation of our railroads, and a primary feature which, in the evolution of the modern railroad, has not been crowded out of existence because it cannot be dispensed with. There is not another essential part of the freight car equipment which costs the railroad companies so little money compared with the service rendered as does the cast iron car wheel. The 600-lb. wheel costs about $10.80 new, and after giving a mileage of 40,000 to 70,000 it is turned back to the foundry at a scrap value of about $7.80, giving a cost per 1000 miles of about 5 cents.

Can it be possible that this showing can ever be beaten with any other kind of a wheel? I very seriously doubt it. An English railroad official a short time ago asked in all seriousness: "Is it possible that you are still using cast iron car wheels? We would be afraid to use them under any of our cars, light as they are?" And my answer was: "I do not see how we can do without them."

Early Wheels.

The origin of the chilled wheel I am unable to state, but that it originated in the United States there is no reason to doubt. I remember, however, that 25 years ago there was quite a variety of cast iron car wheels. There were the single plate wheels, some with and some without raised ribs or spokes, some corrugated and some plain. Double plate wheels there were of many sections, and both single and double plate wheels were made in all sizes from 30 to 42 in. in diameter, with long hubs and short hubs, some having their greatest projection beyond the outside and some beyond the inside, with width of tread and thickness of flange varying also, but not so widely, until the Master Car Builders' Association succeeded in getting adopted a standard wheel diameter, a standard section of tread and flange, a standard length of hub and a standard diameter of wheel seat for each size of axle. We are in full possession of all the benefits derived from these standards, beyond computation as they are, and it is hard to believe that there are railroad officials to-day who do not appreciate what the Master Car Builders' Association has achieved in this and other matters, and what may yet be done with proper support and recognition.

The Car Wheel Foundry.

The foundry where the wheels are made is a never failing attraction, and its layout and equipment highly important. Until a few years ago the wheel foundry was usually laid out in circular floors or molding sections, each floor being served by a jib crane set in its center for handling the chills and molds while being rammed up and prepared for the hot metal, for handling the hot metal in the ladles while filling the molds, and for handling the hot wheels while being taken from the molds and started toward the annealing pits.

The circular floor, however, was not economical of space or labor, and it is rapidly giving way to the electrically operated foundry, laid out in rectangles, the Angus foundry of the Canadian Pacific Railway being one of the latest and most improved of this type. This foundry is laid out with the core rooms, with their ovens, the elevator cupolas and the charging floors along one side of the building. The floors or molding equipments are laid out in parallel lines, with 9-ft. centers, each with a capacity of 20 wheels. The hot metal is supplied by buggy ladles along one end of these floors, and the finished hot wheels are removed by buggies along the opposite end, one end of the building being devoted to the pits for annealing the wheels, the stacking floor to receive them after being removed from the pits and the foreman's office.

The manufacture of the wheels commences at the breaker, where old car wheels (to the extent of from 40 to 60 per cent. of the weight of new wheels turned out), are broken by the big drop weight, the foreman carefully inspecting the broken pieces, so that he may determine what proportion and variety of new pig shall be used with each charge.

The hot wheels are placed in the annealing pits as soon as practicable—that is, when cool enough to handle with no danger of warping or bleeding after being placed in the pits. The wheels remain in the pits about four days, cooling slowly and uniformly, but are generally as hot as can be comfortably handled when taken out. After being taken out they are cleaned, inspected, taped and tested, representative wheels being taken for the latter purpose. The thermal is the only test now in force at Angus, the severity of it being sufficient, it is considered, to permit dispensing with the drop test, which was the old standby.

Defects Not Attributable to Cast Iron.

Cracked plates, cracked brackets, shelled out spots, worn flat spots and treads worn hollow are defects of manufacture, and should not be considered as evidence of general unreliability of the cast iron wheel, as they can be avoided by putting better material and more careful work into the wheel. Worn flanges are generally traceable to one of the following causes: Trucks which do not curve easily, couplers without sufficient lateral clearance, cutting by brake shoes and inaccurate mating of wheels.

I believe that proper care is very rarely given to the last named operation, and in consequence wheels one or more tape sizes apart are sometimes mounted on the same axle, to begin, as soon as put in service, destructive flange wear and increased load on the engine. Until quite recently the part the brake shoe plays in flange wear has been given very little attention, but the air brake men, in their deliberations, have called attention to the poor service given by brake shoes set too wide apart, which form flanges on the shoes over the wheel rims, frequently leaving less than half the area of the brake shoe in contact with the wheel tread, with the resultant loss of frictional contact and a waste of brake shoe metal. But the wheel flange also suffers by this improper arrangement.

Too little attention is given to the proper hanging of brake beams, to the centering of the brake heads with relation to the tread of the wheels, as also to the necessity of uniformity in the length of the brake hangers. Any of these defective practices will result in poor braking service and injury to the wheel. A brake shoe when first applied may overlap the rim of the wheel ever so little, but with each reduction of its thickness in service the lap will increase and the brake shoe on the other end of the brake beam will be forced more and more against the flange of the wheel, gradually bringing about the condition described as worn flange.

I have described this condition particularly because it is one which is not generally given the consideration it deserves, and I am sure that if brake heads are set at 60-in. centers, instead of 60½ in., a considerable reduction of flange wear will be noted and we will wear out our brake shoes evenly and uniformly, and get the work out of them for which they are made.

Wearing Qualities of the Chilled Tread.

The importance and value of the cast iron wheel in railroad service lies unquestionably in the wearing qualities of its tread or tire, the more than steely hardness of which gives more mileage for the same amount of wear (or metal removed), than any other wheel in existence. And not only does it stand up well under its present service conditions—that of carrying heavy loads over steel rails made as hard as they can be without danger of breaking; it also withstands with comparative freedom from failure the tremendous friction of the brake

* A paper read before the Canadian Railway Club, Montreal. Mr. Fowler is Master Car Builder of the Canadian Pacific Railway, Montreal.

shoes when making stops from a high speed, or when descending long, heavy grades.

It is not uncommon in mountain districts to see the grease on the face of the wheels smoking from this cause, the wheels themselves being too hot to touch, and the brake shoes red hot, and it will be, I think, very difficult to produce materials of any other kind which will give us wheels so serviceable, so economically manufactured and so valuable when worn out, as the chilled cast iron wheel.

The Development of Wheel Design.

The design of the present wheel is a matter of evolution, or survival of the fittest. The amount of iron in the hub is that which has been found necessary in service to stand not only the pressure at which the wheel is forced on the axle without fracture, but the tremendous force exerted by the brakes when a stop is being made, which tends to loosening of the wheel on the axle seat unless forced on at the proper pressure, which pressure cannot safely be applied without the proper amount of metal in the hub.

The length of the hub has also, of course, much to do with the question of thickness of it and the pressure at which the wheels are mounted, but both have been decided by that safest of teachers, experience, and there is practically no dissent from the Master Car Builders' Association's standard practice of to-day. The size and form of the ring core, as it is called, which gives the inner surfaces of the double plates their proper thickness and outline, is also the result of long experience and test. Many slight variations have now given away, the last design of ring core submitted by the Master Car Builders' Association being in general use.

The number and form of the brackets is to some extent not uniform, the Master Car Builders' form and number not yet being accepted by some as the most desirable, but it will require more experience and longer service to determine whether the increased number of brackets, and consequent increase of weight, will do all that is claimed for them. With the experience had on the Canadian Pacific Railway, I believe they will, for reason to be given later.

The outline of the tread was recently subjected to some change by the Master Car Builders' Association, the slight increase in the coning making it 1 in 20, instead of 1 in 25, as formerly, and the making of the coning simple instead of duplex being done to cause the wheel to run more nearly upon the center of the tread and away from the flange, which is the weak part of the cast iron wheel of to-day. But is this weakness surprising? The flange of the wheel of 1905 was originally designed for cars of 20,000 and 30,000 lb. capacity, the length of these cars was from 20 to 28 ft., and they were run at speeds of from 10 to 20 miles per hour, and yet, under cars of 80,000 to 100,000 lb. capacity, run at speeds of 30 to 45 miles per hour, the same flange has done fairly well, but there have been many failures.

The flange, amply strong under the light cars, developed a tendency to break off at the throat, there not being enough metal there to withstand the brake shoe and rail friction, the latter being aggravated by the heavy car, and by the heavy lateral thrust against the rail of the wheel going at high speeds. Evidence of the trouble develops first in the form of fine cracks, fine as a hair, which appear at or near the throat of the flange, and which in continued service extend around the wheel and into the tread, until sometimes it can be seen under the tread, having continued through the body of it, and extended across one or two of the brackets. Unless removed at once the wheel is ripe for serious trouble.

Breaks in Wheel Flanges.

The number of wheel flanges broken during the past few years has been the cause of serious concern to the mechanical departments of the railroads, and the Master Car Builders' Association, after becoming convinced that flange failures of this kind were not confined to the wheels made in any particular foundry, and accordingly not due to any special mixture, placed the matter in the care of a committee, who recommended at the last convention that the thickness of the flange be increased by ⅛ in. when measured at the gauge line, this increased thickness tapering to nothing near the apex of the flange. In doing this they had the sanction of the Maintenance of Way and the American Railway associations, who were satisfied, after close investigation, that this increased thickness would necessitate no change in frog or guard rail clearance, and the thicker flange has since been adopted by Master Car Builders' Association letter ballot, so that the benefits of this improvement should soon be apparent.

It is probable, however, that this will not entirely remove the trouble, and it may be necessary at some future time to further strengthen the flange. In an endeavor to supplement this strengthening of the flange we have, on the Canadian Pacific Railway, changed the section of the wheel, making no change, however, in the tread and flange outer outline. The change consists in making the brackets to a smaller radius, and so extending them under the throat of the flange as to make them practically continuous, and thereby add materially to the thickness of metal at this point. This practice, while not in service long enough to demonstrate the full value of it, has been of such value as to extend its application to Canadian Pacific Railway wheels for cars of all capacities, having been first proven valuable under heavy service.

Good Material Required for Good Wheels.

Let it not be forgotten, however, that first-class service cannot be expected from wheels made with poor materials. The finest quality of charcoal iron is none too good for the cast iron wheel, and in as large proportion as conditions will permit. Some of the largest wheel manufacturers on this continent state that wheels can be made from noncharcoal iron that will meet the requirements of any railroad service, whether passenger or freight, which would indicate that the price paid is to some extent responsible for wheel failures. Do not forget also that the best wheels made can be so misused during the assembling operations as to cut short their life.

Bore them out of true, or locate them at different distances from the center of the axle, or mate wheels of different tapes on the same axle, and long before the guarantee limit is reached one wheel will have a worn flange. There are other causes for worn flanges, as has been said, but those just referred to are within the province of the men who mount the wheels on the axles to prevent, and they must do so.

In conclusion I would say, I know of no reason why so essential a part of the freight car cannot be so modified and improved as to be perfectly safe and economical under cars of the highest capacity, and if its friends will only stand by it will successfully meet and overcome competition of any kind and from any source whatever.

The new power plant of the Juniata Hydro-Electric Company, on the Juniata River, near Warrior Ridge Station, Pa., will furnish light and power to railroads and industrial plants throughout the Juniata Valley, with transmission lines and distributing stations extending from Altoona to Lewiston. A second hydraulic plant is located at the lower end of the gap. The two contain nine turbines of 1000 hp. each direct connected to 500-kw. alternators. An emergency steam driven plant consists of four Curtis steam turbine driven units aggregating 4500 hp. Other power plants are contemplated which total output 20,000 hp. The total construction cost will be about $2,500,000.

Sulphur as a wood preservative has been widely tried in Germany. The sulphur is applied in liquid form, and, hardening, completely fills the cellular spaces of the wood. Although the sulphur oxidizes readily when subjected to a very high temperature, it is claimed that at a moderate temperature it resists the action of water and also of acids, and when cold it resists the effects of alkaline solutions. Sulphur melts at 115 degrees F.; hence it is doubtful if it would be much of a preservative in outside construction, where the summer temperature approaches this figure (in the sun). Numerous experiments have appeared to demonstrate that poplar best receives this treatment, and oak and pine not so well.

A German Two-Step Drawing Press.

The modern tendency in the sheet metal working industry to replace pieced wares by drawn goods has brought the art of drawing sheet metals to a high state of perfection and usefulness. The illustrations show a drawing press of new construction, which performs two consecutive drawing operations at one stroke, and is built by the Bonn Ironworks, Fr. Moenkemoeller & Co., Bonn on the Rhine, Germany. The manner in which the tools work will be understood from their sectional views, Figs. 1, 2 and 3, which show the different stages at the start and finish of the two consecutive drawing operations, A representing the die, B, the outer blankholder, C, the inner blankholder, and D, the punch. After the blank is drawn by the simultaneous action of the inner blankholder C and the punch D, this punch continues to descend, while C acts as the blankholder. As the number of strokes per minute is that of a standard drawing press, twice as much work may be done in the same time and with the same help and space without exchanging tools. No greater strain is put upon the blanks which may be cut from sheets of standard material.

The engraving, Fig. 4, illustrates the improved construction of the press, which is the outcome of years of experience. The table is operated either by steel rolls and cams, as indicated in Fig. 4, or better, by a very simple system of links, as shown in Fig. 5, which avoids all the defects of a drawing press with movable bed. The strain arising from the pressure put upon the blanks is transferred through the straightened toggles, Fig. 5, directly to the frame of the press instead of falling on the main shaft, thus relieving the bearings from all friction and wear due to the blank holding. As a consequence, the pressure on the blank remains always uniform, and easy means are provided for compensating for whatever wear may be occasioned by long continued use. Another advantage is that the toggle press, unlike the cam drawing press, may be used also for stamping goods with the table fastened.

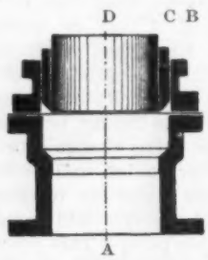


Fig. 1.—The Start of the Drawing.

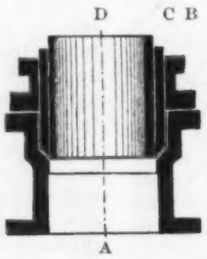


Fig. 2.—The First Drawing Completed.

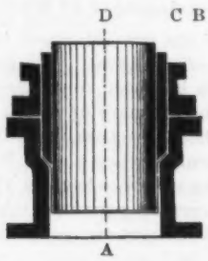


Fig. 3.—The Second Drawing Completed.

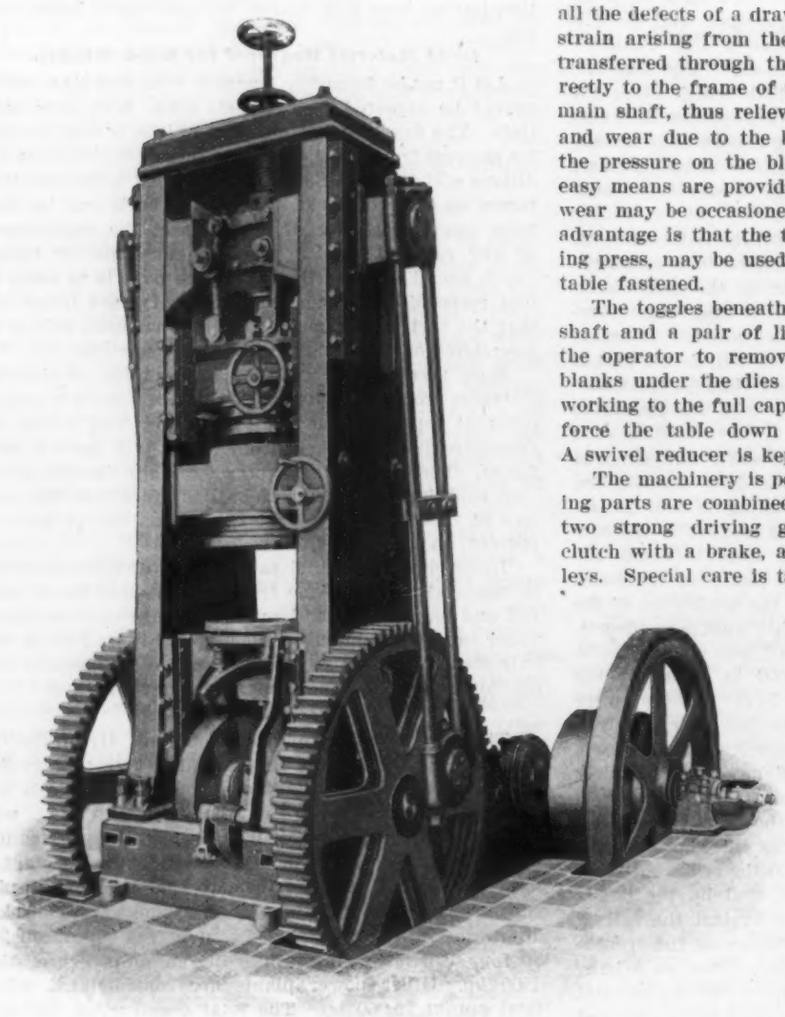


Fig. 4.—The Two-Step Drawing Press with Cam and Roller Operated Table.

The toggles beneath the bed are operated by the main shaft and a pair of links. The table movement allows the operator to remove the drawn shells and put new blanks under the dies with the greatest ease even when working to the full capacity of the press. Cams and rolls force the table down positively to the lowest position. A swivel reducer is kept in the table.

The machinery is powerful and rigid. The main driving parts are combined in a heavy frame and consist of two strong driving gears, an exact working friction clutch with a brake, a flywheel and tight and loose pulleys. Special care is taken to make the press easily controllable by a hand lever with counterweights. The press may be promptly started and stopped at any point by means of the friction clutch and the conical brake.

The hollow cast uprights of the frame support the guides for the table, the inner blankholder slide and the plunger, all three of which are long and are provided with adjustable gibs. The guide of the outer blankholder and a headplate connect the two uprights. Large square threaded screws with handwheels are used for setting the slide of the two blankholders, as may be seen in Fig. 4, and are quick in their action. The spindle of the punch is hollow, and is also easily adjusted with handwheels, shown at the top. Four pairs of toggles guided by rollers bearing on curved cam surfaces connect the guide of the plunger with the slide of the inner blankholder.

The operation of the press is very simple. After the blank is put into the press, the table takes it up to the outer blankholder and clamps it. Then the guide of the punch and the inner blankholder slide move down simultaneously until the tools arrive in the position, Fig. 2, where the slide stops. While the punch continues to des-

cend, the four rollers are deflected and transfer the pressure of the inner blankholder to the frame. As soon as the two drawing operations are performed, all parts return quickly to receive a new blank. An adjustable knockout is arranged under the table.

The press shown in Fig. 4 will handle blanks up to 22⅞ in. in diameter; of any gauge up to No. 22 B. W. G. It will draw and lift out any depth up to 9½ in. The driving pulleys are intended to run at 220 rev. per min., at which speed the main shaft makes 8 rev. per min. The press weighs about 28,600 lb.

Shop Heating.

In a dwelling, where the cubic space per occupant is large and the chances for air to leak in and out are numerous, the necessary ventilation is obtained by natural means. In a crowded hall, however, extensive means are necessary for introducing fresh and removing foul air. In a shop the conditions are midway between. As a rule the atmosphere is not excessively polluted by respiration, but in many cases a positive ventilating system is essential to good health. For shop heating a fan blower installed in connection with a heater makes necessary one-third to one-fifth of the heating surface required for heating by direct radiation. All of the surface is massed in the heater, the danger of freezing and consequent leakage is entirely eliminated, and positive control is had over the temperature and volume of air supply.

In a new brick building the distributing system can often be hidden, the air being carried in underground ducts or in wall flues. In an old or wooden building galvanized iron distributing ducts are usually carried overhead and the air is discharged toward the outer walls. In a general way such a system improves the conditions even while there is vitiation from sources other than respiration, but the best results are obtained when there is also an exhaust system. With a forced system alone, creating a light pressure within the building, direct ventilating shafts may be sufficient if the pollution is not serious. Otherwise it is imperative to introduce an exhaust fan in connection with a system of piping and hoods to remove the gas, dust and foul air.

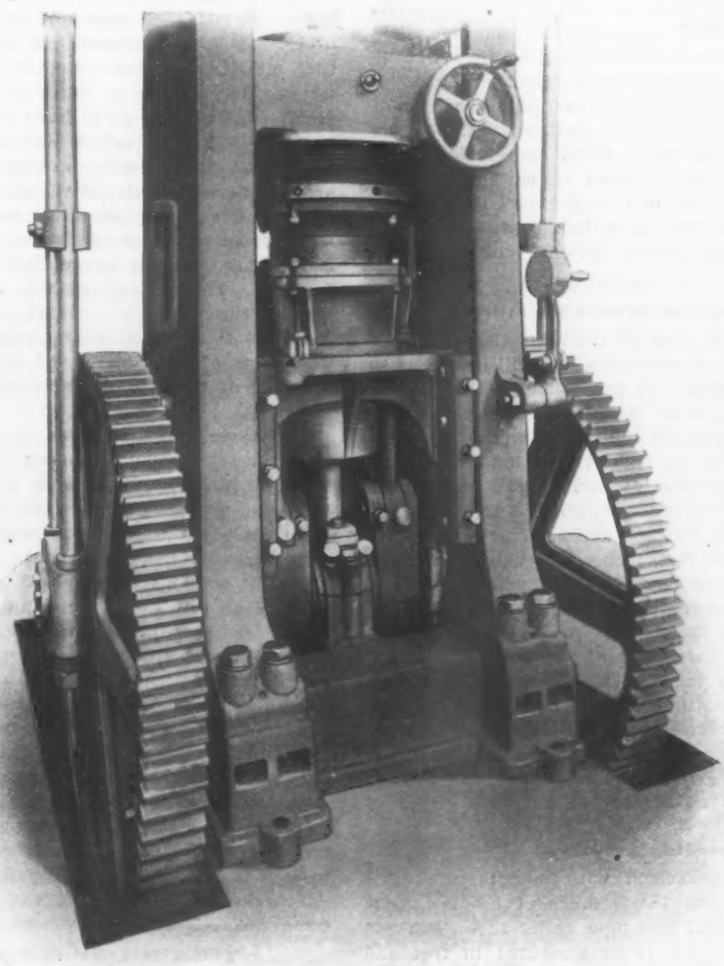


Fig. 5.—Detail of a Similar Press with the Table Operated by Links.

That direct current at high tension can be used successfully for the long distance transmission of power has been well proved by the St. Maurice-Lausanne plant, in Switzerland, designed on the Thury system. Recent tests made at Geneva, it is claimed, have demonstrated that voltages can be used two or three times as heavy as the highest allowed for alternating current upon overhead lines. This should largely increase the distance current can be transmitted. Experiments with new apparatus, undertaken by eminent engineers from different parts of Europe, show that as high a voltage as 100,000 between the earth and the wire can be carried. This is equivalent to 200,000 volts between two wires. As the present practicable limit with alternating current appears to be about 60,000 volts, the experiments have great practical interest, and important developments should follow.

For making small patterns that will not shrink in casting the best mixture is said to consist of the following parts by weight: Lead, 69; antimony, 15½, and bismuth, 15½. A cheaper mixture for finished patterns contains 10 parts zinc, 1 part antimony and 1 part tin.

The Metric System.*

BY GEORGE SCHUHMANN, READING, PA.

I do not intend to go into any discussion of the scientific merits of the metric system, but having lived in Germany before, during, and after the time the metric system was put in force there, having worked in a shop where both English and metric measurements were used side by side, and in addition thereto having used the English system in almost daily practice for over 30 years, I want to confine myself to the practical side of the question only, and at the same time give expression to my opinion, based on these many years of actual experience, that for the average daily practice the metric system is much easier on a man's mind and a still greater mental labor saver to those who have to calculate much in volumes and weights, moments of inertia, &c. I also wish to state that the fears of most of the antimetric advocates of the terrible confusion and enormous loss of money that would result if the metric system was introduced here are very much exaggerated.

All admit that it would be a desirable condition if the weights and measures of all civilized nations were alike, and no reasonable mind could expect the metric countries to give up their rational system for the English system—no more than one could expect this country to give up its decimal system of dollars and cents and return to the guineas, pounds, crowns, shillings, pence and farthings of England.

A Few Exceptions Would Not Hurt.

Much ado has been made by the antis that in metric countries some of the old measures are still in use. But what of it, if they are? Do not condemn the rule on account of a few exceptions. Let the jeweler sell his diamonds by the carat and let the textile worker spin his yarns by the yard, but do not let that hinder us from abolishing the various sizes of barrels, gallons, bushels, pecks, cords, perches, hundredweights, long and short tons; the rods, chains, feet and decimal fractions of feet by civil engineers; the feet, inches and vulgar fractions of inches by mechanical engineers, &c., while the chemists, electricians and scientific men are already contentedly using the metric system.

I have no doubt that some of the old terms would also survive for many years in this country. The farmer would very likely continue to sell his peaches by the "basket," his strawberries by the "box," and measure the hight of his horses by "hands." But this will not confuse the metric system any more than the English system, since it has no direct relation with either of them.

Regarding Accuracy.

The firm I am connected with manufactured and shipped last year about 15,000 miles of tubular goods in the shape of wrought iron pipe, boiler tubes, &c., and every length of this had to be measured in feet and inches and then added by the tally clerks. On most goods we ignore fractions of inches, or else the job of adding would be still more complicated. If this same work were done by the metric system, giving the lengths in centimeters, it would be much nearer to the actual length and require considerable less mental work.

While some new gauges would be required, most of the existing ones for interchangeable work could be retained and simply be rechristened into metric terms if so desired. Much stress has been laid upon the fact that all the English dimensions cannot be expressed in metric units without going into many decimals, but for all practical purposes a few decimals will answer, and in most cases can be omitted altogether. The circumference of a circle in proportion to its diameter cannot be expressed exactly in figures, and still for all practical purposes 3.14 is good enough.

Many United States standards are only nominal sizes anyway. A 3-in. turned shaft is generally 2 15-16 in. in diameter. A 2-in. dressed plank is supposed to be made of lumber which was 2 in. thick before it was dressed, leaving it about 1¾ in. thick when finished.

The wrought iron and steel pipe sizes are only nominal. They are supposed to express the inside diameter of the pipes, but that is only up to 12 in. Above that it means the outside diameter; and all boiler tubes are also measured by the outside diameter. A ½-in. pipe has a hole of practically ⅝ in., while a 1-in. double extra heavy pipe is less than ⅝ in. inside diameter, but it is explained that the outside diameter of the 1-in. double extra heavy pipe is the same as the so-called 1-in. standard pipe, which is supposed to have a 1-in. hole, but which actually is about 1 1-16 in.

How Pipe Threads Were Made Uniform.

When the question of uniform pipe threads was up before this society 20 years ago all the pipe manufacturers of this country claimed that they had made their gauges exactly to the figures given by the Briggs formula, and still their goods did not interchange with each other. At the suggestion of this society's committee each manufacturer sent samples of pipe threaded according to their gauges to the Pratt & Whitney Company, Hartford, Conn., so as to have them compared with the gauges which the Pratt & Whitney Company had made with great care to comply exactly with the Briggs standard. Some of the samples varied as much as six or seven threads, *i. e.*, the pipe of the one manufacturer would screw from six to seven threads farther into the Pratt & Whitney Company gauge than that of another manufacturer. The consequence was that nearly all the pipe manufacturers of this country purchased new gauges from the Pratt & Whitney Company, which were exact duplicates of each other and the interchangeability of all pipes of different manufacturers was very much improved.

All these gauges can be, or, in fact, should be, retained, because from a practical point of view the American standard for pipe threads is superior to the English or other European pipe threads, on account of the greater taper. All that would be necessary would be to call the old gauges by the approximate metric dimensions. Of course, it would also be desirable that the English pipe threads, as well as bolt and nut threads, should be interchangeable with the United States standards, but that they are not interchangeable now is not the fault of the metric system.

With the pipe threads remaining, according to the old standards, it would not be necessary to tear the old gas pipes out of the houses of ceilings to fit a new chandelier, as had been hinted in some of the previous discussions.

It would also be unnecessary to relay our railroad tracks and rebuild the rolling equipment. All we have to do is to call the track 1436 gauge instead of 4 ft. 8½ in. Air brakes, hose couplings, car couplers, &c., could all remain exactly as they are now.

The Metric System Easily Mastered.

Mr. Towne fears that 95 per cent. of the present army of Government clerks would be disqualified for a long time from doing efficient work if the metric system was introduced here, but I believe he is doing the Government clerks an injustice. I have seen the metric system introduced in an American machine shop so as to produce work according to metric dimensions. The workmen were all Americans who had not used the metric system before, and in a few days they had thoroughly mastered it—at least as far as their work was concerned—and I should think that the Government clerks would be able to do as well as machinists.

I am well aware that a change of this kind cannot be made suddenly. In Germany the schools had prepared the younger generation for it some years in advance, and when the change finally did come it caused comparatively little confusion. The old carpenters and other old mechanics who had used the foot rule all their lives naturally were somewhat slow to use the new system, while most of the machinists, on account of their using smaller fractions, took to the metric system very quickly.

* Contribution to the discussion of Henry R. Towne's paper before the American Society of Mechanical Engineers, December, 1906. Reprinted from the March number of the *Proceedings*.

Continued Use of Old Terms by Some.

The younger people had patience and tolerance for the old people's habit of calling things by their old names, and as they understood what was meant no confusion was caused thereby. It was very similar to the practice which I remember to have been in vogue in New York and Long Island about 30 years ago when the old inhabitants would use the word "shilling" in speaking of values, not the English shilling of 24 cents, but a shilling of 12½ cents. They would even prefer to say eight shillings rather than one dollar. I do not suppose that any merchant made his calculations or kept his books on the shilling basis, preferring no doubt the decimal system of dollars and cents, but this did not prevent him from doing business with the old folks, if for the sake of sentiment or from force of habit they would call for 12 shillings' worth of goods, nor did it cause him any serious mental calculation.

I well remember when working in a machine shop in Germany we used the Whitworth taps and dies for bolt and screw threads and called them by their English dimensions without in any way interfering with the use of the metric system for the other work. I understand that these screw threads are still made according to the same Whitworth standards, but are now called by their nearest dimension in millimeters instead of fractions of inches; this points the way how easy it will be to maintain existing standard gauges, including Mr. Towne's lock part of 0.51 in., without interfering with the use of the metric system for general purposes.

Advantages to Draftsmen.

On the other hand, consider the advantages of the metric system to the vast army of draftsmen. There does not appear to be any fixed rule with the English system in regard to figuring drawings. Some mark 1′ 10″ while others will mark it 22″, and I know of expensive errors made on account of reading 22″ instead of 2′ 22″, and other similar misreadings. Such errors are practically impossible with the metric system, as the misplacement of a decimal point makes the error so obvious that it is easily discovered.

Metric drawings are generally made to one of the following scales: Full size, half size, 1 to 5, 1 to 10, 1 to 20, 1 to 50 or 1 to 100; all of which can easily be measured with an ordinary metric rule. Compare the attempt of measuring with a common English rule some distance on a drawing 3-32 in. to the foot with the ease of doing the same thing with a metric rule on a drawing 1 : 100.

I am very much surprised to learn that so many influential members of this society have such a great fear of, and are so strongly opposed to, the introduction of the metric system. I can only assume that they are unfamiliar with the practical use of it, for I am sure that if they would cultivate a closer acquaintance with the beauties of the metric system in actual use their opposition would soon fade away. The metric system is bound eventually to supersede all other systems of weights and measures. I do not mean to say that this will happen in the near future, as it appears that the majority is not ripe for such a step just yet, but another generation will take it up—one that will consider this matter with less prejudice and less fear—a generation of engineers who will not hesitate to inconvenience themselves temporarily, and even go to a little expense in order to make the work of draftsmen and mechanics and, in fact, of all people who have to calculate in weights and measures less laborious.

The rapid growth of electrical equipment is making it more and more necessary for the mechanical engineer to familiarize himself with electrical science, just as a knowledge of chemistry is indispensable to the metallurgical engineer, or that of geology to the mining engineer and civil engineer. Since all electrical units are based on the metric system, and since the chemists and scientists all over the world are using it now, I know of no better medium than the metric system to facilitate the acquisition of that knowledge which is necessary to the engineer to enable him most effectively to adapt the achievements of science to the use of mankind.

The Railway Steel Spring Company's Report.

The annual meeting of the stockholders of the Railway Steel Spring Company was held March 7, at which the financial statement for the year ending December 31, 1906, was presented by President W. H. Silverthorn. The results of the year's business, as compared with 1905, were as follows:

	1906.	1905.
Net earnings	$2,341,120.19	$1,949,993
Interest on Latrobe plant bonds	215,587.48	.....
Balance	$2,125,532.71	$1,949,993
Dividend, preferred (7 per cent.)	944,979.00	944,977
Balance for common	$1,180,553.71	$1,005,016
Dividend, common (4 per cent.)	539,988.00	539,988
Surplus	$640,565.71	$465,028
Account Latrobe plant purchase	450,000.00	.....
Final surplus	$190,565.71	$465,028
Previous surplus	2,045,899.16	1,580,871
Total surplus	$2,236,464.87	$2,045,899

The balance sheet, as of December 31, compares as shown below:

Assets.	1906.	1905.
Plants	$29,627,026.25	$24,960,267
Merchandise on hand	2,203,043.43	1,152,736
Stocks, bonds and investments	202,158.85	764,838
Accounts receivable	1,873,451.29	1,847,353
Other items	38,998.67	33,285
Cash	312,637.42	1,104,030
Totals	$34,257,315.91	$29,462,510
Liabilities.		
Preferred stock	$13,500,000.00	$13,500,000
Common stock	13,500,000.00	13,500,000
Latrobe plant bonds	4,362,000.00	.....
Accounts payable	330,434.38	295,647
Bills payable	200,000.00	200,000
Reserved for preferred dividend, taxes, &c	128,416.66	120,964
Surplus	2,236,464.87	2,045,899
Totals	$34,257,315.91	$29,462,510

The retiring Board of Directors was re-elected, with the exception that George G. McMurtry, was chosen in place of Charles Scott, Jr., resigned.

The Richmond Foundry & Mfg. Company.

The Richmond Foundry & Mfg. Company, Incorporated, Richmond, Va., is now occupying its new works, erected for the manufacture of gray iron castings, stoves, scales and for the production on order of automatic machines. The plant comprises a foundry, machine shop and warehouse, with the usual accessories, located on the Hermitage road, just north of the Seaboard Air Line tracks, from which a spur has been built into the works. The tract comprises 10 acres of land, thus giving opportunities for enlargement.

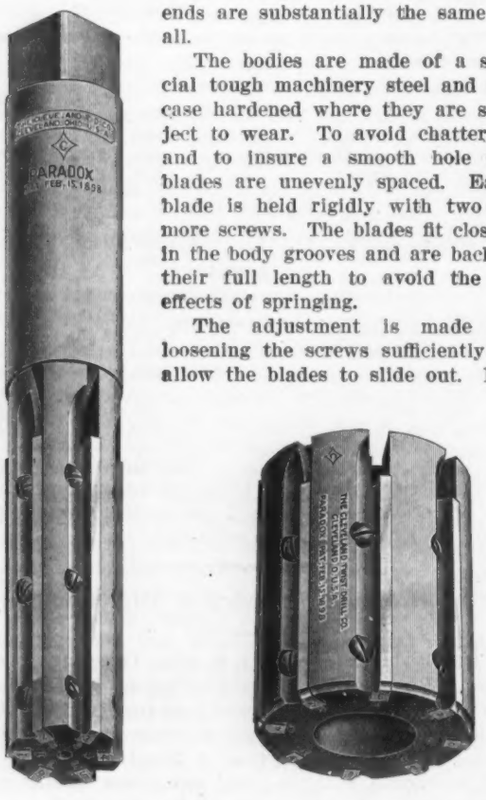
The foundry is a steel building, 80 x 320 ft., having cement floors and equipped with two Whiting cupolas, a Root blower and overhead trolleys. Immediately adjoining the foundry is the cleaning room, from which castings pass to the grinding and storage rooms, which are located between the cleaning room and the machine shop. The cleaning room is 80 x 80 ft., the grinding room 40 x 80 ft., the storage room for castings 40 x 80 ft., and the machine shop 80 x 160 ft. The pattern vault, which adjoins the foundry, is a fireproof building, solidly constructed of brick and having a concrete roof, thick wire glass lights and a double steel door. A three-story warehouse, 80 x 160 ft., has been erected in proximity to the machine shop. The arrangement of the works is such that the castings pass in regular progression from the foundry to the machine shop and thence to the warehouse.

The comfort of the workmen has been provided for by a lavatory building, 50 x 65 ft., arranged at a convenient location and completely equipped with shower baths, closets, washbasins, urinals and expanded steel lockers for both the white and colored help.

Arthur Scrivenor is president and general manager of the company, R. G. Rennolds is vice-president, and J. Stuart Rennolds is secretary and treasurer.

The Paradox Adjustable Reamers.

The old prejudice against adjustable reamers as being unfit for the service ordinarily required of a solid reamer is fast disappearing, as now there are several makes of adjustable reamers that have proved their worth. The Paradox adjustable reamers, herewith illustrated, and made by the Cleveland Twist Drill Company, Cleveland, Ohio, having a mechanically good method of holding the blades firmly and being constructed of high grade material throughout, are claimed to have the good qualities of a solid reamer, besides the advantages of the adjustable feature. The reamers are made in various forms, principally differing in the shanks. For example, there is the adjustable hand reamer, with a square head; chucking reamers, with straight and taper shanks, and shell reamers, adapted to go on arbors, with various forms of shanks. The principle of holding the blades and the construction of the working ends are substantially the same in all.



The bodies are made of a special tough machinery steel and are case hardened where they are subject to wear. To avoid chattering and to insure a smooth hole the blades are unevenly spaced. Each blade is held rigidly with two or more screws. The blades fit closely in the body grooves and are backed their full length to avoid the ill effects of springing.

The adjustment is made by loosening the screws sufficiently to allow the blades to slide out. For increasing the diameter tin foil is used to back each blade, this being applied in thicknesses of 0.0005 or 0.001 in. The tin foil is cut in strips of the width and length of the blade and must be laid evenly in the grooves, any number of thicknesses being used to give the desired diameter. With this adjustment the blades can be ground a number of times, thus keeping the reamer up to a standard size or increasing its diameter when a job requires it. It is best to restore the blades to the slots from which they were taken, and for that purpose the blades and slots are numbered with like numbers, so that this may be easily done.

The Paradox Adjustable Hand and Shell Reamers Made by the Cleveland Twist Drill Company.

The Paradox adjustable hand reamers and chucking reamers are made in all standard sizes, from 11-16 to 3 in. in diameter, and the adjustable shell reamers in sizes of from 1¾ to 6 in. in diameter. The shanks for the shell reamers are made in various sizes to suit the reamers and the style of socket in which the reamer is to be used.

W. S. Barstow & Co., engineers, 56 Pine street, New York, and Failing Building, Portland, Ore., have made some important additions to their organization. The drafting department has been greatly enlarged and Thomas Richardson has been placed at the head of it. He has had wide experience in power plant designing. Associated with him and in charge of steel structural designing is Harold S. Richmond. The drafting force now numbers about 30 men, well versed in all branches of engineering. Werner Boecklin, now with the firm, has designed a number of noteworthy conveying plants for handling materials. Armin Schotte, another acquisition, as consulting and designing engineer, has built many industrial plants, among the more prominent being the Mesta Machine Company, Pittsburgh.

A Rateau Steam Regenerator Installation.

The first application in America of the Rateau process for the utilization of exhaust steam from intermittently running engines has been put in operation at the steel works of the International Harvester Company, South Chicago, Ill. The principles of the process and description and illustrations of the apparatus used in it were given in *The Iron Age*, June 2, 1904, in an abstract of a paper by Prof. A. Rateau, presented before the joint meeting of the Institution of Mechanical Engineers and the American Society of Mechanical Engineers at Chicago, June 1, 1904, on "Different Applications of Steam Turbines." An announcement when the installation here referred to was proposed, was contained in *The Iron Age*, July 19, 1906. In connection with this was given an extract of a paper by L. Battu, president of the Rateau Steam Regenerator Company, on "The Utilization of Exhaust Steam from Rolling Mill Engines, Hoisting Engines, Steam Hammers, &c., by Means of Steam Regenerators and Low Pressure Turbines on the Rateau System," which reviewed the nature and functions of the regenerative steam accumulator.

In this first installation, as now completed, the exhaust steam from a reversible blooming mill engine is utilized in a low pressure Rateau turbine of 600 kw. capacity, direct connected to two direct current 250-volt generators. To regulate the intermittent flow of steam, the exhaust of the blooming mill engine is passed through a Rateau steam regenerator of the water type, which has a capacity sufficient to take care of intermissions of several minutes' duration in the running of the main engine. The steam then feeds the low pressure turbine and is condensed in a barometric condenser.

The pressures are atmospheric pressure absolute at the inlet of the turbine and 28 in. vacuum at the outlet. The quantity of steam available from the main engine is more than twice the amount needed by the turbine. In order to avoid back pressure on the engine, a 24-in. relief valve exhausts direct to the atmosphere when the pressure tends to increase. If the main engine is shut down for a long time an automatic reducing valve supplies steam from the boilers directly to the low pressure turbine.

It has been demonstrated by this process that in the exhaust of an average size reversible blooming mill engine there is enough power available to generate from 1000 to 1500 kw., the only expense being interest on the investment and condensing water.

A. Leonhauser, engineer of the International Harvester Works, in collaboration with C. H. Smoot, of the Rateau Company, designed the entire plant, and to them is due much credit for their success in applying entirely new features in this first plant. The turbine and dynamos were manufactured by the Western Electric Company in its Hawthorne shops, from the drawings and specifications furnished by the Rateau Turbine Company and under the supervision of the latter. The barometric condenser and air pump were furnished by the Alberger Condenser Company, New York. The steam regenerator, designed by the Rateau Steam Regenerator Company, was built by John Mohr & Sons of Chicago. The piping was furnished by the Best Mfg. Company, Pittsburgh. The whole plant was contracted for and put in operation by the Rateau Steam Regenerator Company, 215 Wabash avenue, Chicago, which handles the exclusive rights in America for the steam regenerators.

The Increase in Railroad Milage and Equipment.

A compilation of railroad statistics has just been made for the Railroad General Managers' Association of Chicago by Slason Thompson of the Bureau of Railway News. The figures give the condition, business, construction work, &c., of 313 operating railroads of the United States, for the year ending June 30, 1906, and are thus a year later than the last official statistics of the Interstate Commerce Commission, the latter only published on January 24, 1907, being for the year ending June 30, 1905. The railroads from which reports were received by Mr. Thompson represent 206,960 miles, or approximately 94 per cent. of the aggregate mileage of the railroads of the country, and, therefore, "for all practical purposes the summaries prepared from these reports may be accepted as representative of our great transportation industry, because the remaining 6 per cent. consists of a multitude of small roads which serve as feeders to the great systems without affecting the statistics materially one way or another."

The following is obtained from Mr. Thompson's abstract:

Track and Equipment.

On June 30, 1906, the 313 roads reporting operated 206,960 miles of single track, or approximately 94 per cent. of the total single track mileage of the United States. Of this 7569 miles was operated under trackage rights. The aggregate mileage, including tracks of all kinds, was 297,720, which compares with the total of all roads in 1905 as follows:

	1906. Miles	1905. Miles.
Single track	206,960	216,973
Second track	17,526	17,056
Third track	1,752	1,610
Fourth track	1,217	1,216
Yard track and sidings	70,252	69,796
Total mileage (all tracks)	297,720	306,796

These figures indicate that the complete returns for 1906 will show an increase of about 10,000 miles over 1905, of which fully 40 per cent. will be represented in extra tracks and sidings. In 1904 the railroads of Europe had 189,774 miles of single track.

The report gives an estimate of the railroad equipment of the United States on June 30, 1906, as compared with that 10 years before, as follows:

Locomotives:	1906.	1896.	Increase in 10 years. Per cent.
Number	51,357	35,950	42.8
Weight, tons	3,286,848	1,797,500	82.8
Average weight, tons	64	50	28.0
Freight cars:			
Number	1,851,409	1,221,887	51.5
Capacity, tons	58,455,088	29,936,231	95.3
Average, tons	32	24.5	30.6

The number of passenger cars in 1905 was 40,713, as against 9999 in 1895. The estimated cost of new equipment during the calendar year 1906 was $379,245,000. Fully 99 per cent. of all locomotives and freight and passenger cars were equipped with automatic couplers, and locomotives and passenger cars were as fully equipped with train brakes. Less than 13 per cent. of the freight cars are not similarly equipped.

A total of 53,133 miles of track is protected by some system of block signals, as follows: Automatic, 9743 miles; manual telegraph, 41,228 miles; manual controlled telegraph, 1941 miles; staff or tablet, 221 miles.

Employees and Capitalization.

The number of persons reported on the payrolls of the 313 operating roads on June 30, 1906, was 1,460,707, which is equivalent to 707 employees per 100 miles of line, and shows an excess of 78,511 over the total payroll for 1905 and indicates a total payroll approaching 1,550,000 employees. Of these employees 56,696 were enginemen, 59,643 firemen, 41,684 conductors, 113,389 other trainmen, 38,199 section foremen, 327,467 other trackmen, 47,139 switch and crossing tenders and watchmen, 34,592 telegraph operators and dispatchers, 49,517 machinists, 61,432 carpenters and 194,523 other shopmen.

Against a gross capitalization in 1905 of $13,805,258,121, or $65,926 per mile, reduced by the elimination of $2,638,152,129 of stocks and bonds owned to $11,167,105,992, the reports of the 313 operating companies in 1906 show a gross capitalization of $12,109,380,578. This covers only 166,483 miles of the 206,960 miles of line operated, but it includes $2,435,483,698 in stocks and bonds owned. This latter sum is practically offset by $2,322,899,560, the capitalization at 5 per cent. of the rentals paid by the 313 operating companies, leaving a net capitalization of $11,996,796,440. This amounts to nearly $58,000 per mile.

Compared with the official returns for 1896 the figures for 1906 show the following remarkable results:

Miles of line increased 20.9 per cent.; miles of track, 31.7 per cent.; number of locomotives, 31.7 per cent.; weight of locomotives, 82.8 per cent.; number of freight cars, 51.5 per cent.; weight of freight cars, 95.3 per cent.; passengers carried 1 mile, 88.6 per cent.; tons of freight carried 1 mile, 124.3 per cent.; cars with automatic couplers, 243.1 per cent.; cars with train brakes, 265.6 per cent.; gross earnings, 101.7 per cent.; expenses of operation, 98.2 per cent.; wages of employees, 94.3 per cent.; interest and dividends, 70.5 per cent.; taxes, 72.4 per cent. In the meantime the average receipts per passenger mile have decreased 0.4 per cent. and per freight ton mile 6.9 per cent.

A New System of Automatic Railroad Signaling.

A new system of signals is being tried on the Pennsylvania Railroad, which was devised by a committee appointed to investigate existing methods of signal operation and to recommend one which could be adopted all over its lines. These signals are automatically controlled by track circuits, the general principle of which is so largely used by this railroad. The essential difference is in avoiding the multiplicity of signal arms on a single pole as with the existing arrangement there are often five signals on the same mast and an engine driver would scarcely be expected to notice the omission of one light or one blade, especially a top or bottom one.

Three classes of signals are employed in the new arrangement: Class A for high and moderate speeds, with a blade and light for each, is used in conjunction with interlocking and train order signals. By this signal five indications can be given by a combination of three positions of each signal blade, or the corresponding three colors of lights. Signals of this type authorize or restrict train movements, and a train if stopped must stay until the signal is changed, allowing it to proceed. Class B signals are also of the two-armed type, but differ essentially from the Class A signals in that the lower light is staggered in position with the upper, being on the opposite side of the pole and the lower blade is much shorter than the top one. Signals of this type are used for purely automatic circuits, and likewise authorize or restrict train movements, but only for a specified time. An engine driver finding one of these signals at danger is required to stop, wait a certain time, then proceed with caution to the next signal. The third class of signals gives information only regarding switch indicators, flag stations and water tanks, and as these signals are all low they do not interfere with the new signal principle used on the high poles.

In brief, where three signals are used the top arm governs the high speed track, providing no cross over movement is included; the second arm governs medium speed movements and refers to a divergence from the high speed, such as a long cross over or moderate turn out, on which a fair speed is permissible; the third arm, which is much lower and has a shorter blade than the other two, governs low speed movements, such as those against traffic over short cross overs and into sidings. The lower signal has a light of considerably reduced candle-power. All lenses are in three colors, red denoting stop, green proceed with caution and white proceed. These signals are now in operation between Forty-ninth street, Philadelphia, and Elwyn, Pa.

THE IRON AGE

1855—1907.

New York, Thursday, March 14, 1907.

Entered at the New York Post Office, as Second Class Mail Matter.

DAVID WILLIAMS COMPANY, - - - - - - - PUBLISHER
CHARLES KIRCHHOFF, - - - - - - - - } EDITORS
GEO. W. COPE, - - - - - - - - - }
A. I. FINDLEY, - - - - - - - - - }
RICHARD R. WILLIAMS, - - - - - - - - HARDWARE EDITOR

The Future of Railroad Buying.

The two leaders whose exploits in the present period of prosperity have given them undisputed eminence among masters of railroad problems agree in the prophecy of prodigious expenditures for the larger transportation facilities of the future. The enormous continued borrowing and the enlarged security issues of the railroads have been prompting inquiry for many months whether any end was in sight to these demands upon the country's capital accumulations. And just as the difficulty of securing money for projected improvements was being accentuated more sharply than ever Mr. Hill issued his remarkable forecast of railroad requirements in the next five years. It was, in brief, that the growth of the United States will require the construction of 75,000 miles of railroad track, including terminals, in the next five years, at a total cost for new track and equipment of 5½ billions of dollars, or $1,100,000,000 a year. Mr. Harriman's forecast is more startling. He tells us that locomotives have reached the limit of capacity with the present standard gauge; that in order to secure the tractive power the train loads of the future will require, the coming locomotive, if it be steam, must have a greater and hence wider firebox; that freight cars will be all steel, giving greater capacity with less dead weight; that grades must be reduced, tunnels enlarged and bridges rebuilt, to be made equal to the strain of the increased loads.

While quite divergent in form, the Hill and Harriman predictions agree in purport. They represent the judgment of two of the highest authorities in railroad economics, as to the lines which railroad development must follow. They answer the criticism here and there made that railroad requirements of money are getting beyond bounds, with the blunt notification that the demands of the years immediately ahead will be even greater.

Stripping these two remarkable prophecies of whatever in them was intended to countervail the proposed investigation of the capitalizations of the railroads of the country, they are full of suggestion to the iron trade as to the scale of demand to be looked for from its great mainstay. Mr. Harriman's revolutionary programme may not be carried out in this generation, so far as it relates to the substitution of the 6-ft. gauge for the standard gauge of 4 ft. 8½ in. But the other portions of his statement of what must be the line of progress in railroad construction and operation are no violent departure from what has been going on, as is well known, for more than a decade. The railroad statistics recently prepared for the General Managers' Association of Chicago gave a basis for measuring the advance that has been made in the 10 years preceding June 30, 1906. Reports from railroads with a mileage of 206,960, or 94 per cent. of the main track of the country, showed that the number of locomotives had increased between 1896 and 1906 from 35,950 to 51,357, or by 42.8 per cent. In the same period the total weight of locomotives increased by 82.8 per cent. In number of freight cars the increase was from 1,221,887 to 1,851,409, or 51.5 per cent. At the same time the increase in the total freight capacity was from 29,936,231 tons to 58,455,088 tons, or 95.3 per cent., while the average capacity increased from 24.5 tons to 32 tons. These increases have come not by any violent change of standards, though in the case of freight cars the introduction of the steel car has been a most important factor. As new equipment was ordered there has been a gradual increase in weight and capacity. Bridges have been replaced by heavier ones, and this process is going on constantly. Allowances for clearance in the case of overhead work, tunnels and crossings above and below grade have been increased as new steel construction has been planned, and rail sections have increased as locomotives, cars and train loads have grown heavier. The whole movement, in fact, has been directly in line with what Mr. Harriman outlines for the future. The increase in capacity has been so much greater in comparison with the increase in numbers, of cars and locomotives, that it has probably not been fully appreciated.

Mr. Hill's estimate that to keep pace with the growth of the country 75,000 miles of new track must be laid in the next five years is not so stupendous an increase as it appears at first thought. Statistics show that in the 10 years preceding 1906 the railroads already built added slightly more to their second track and sidings than they did to their main lines. This would mean that Mr. Hill's programme calls for 7500 miles of new main line a year and about an equal amount in second tracks, which is not the dream some commentators have made it, considering the new basis for reckoning which the past eight years of prosperity have given us.

What the iron trade has to look forward to, as has been well indicated by the developments of the past 10 years, is the constant replacement of existing railroad track, bridges and equipment by heavier, the replacement of buildings of wood and brick by structures of steel, the discarding of the old in every line of engineering, and the substitution of new types calling for more steel. Mr. Hill's estimate of $1,100,000,000 a year for new railroad and its equipment means that half the value of a good year's crops of cereals in the United States must be devoted to increasing the country's transportation facilities.

Without passing upon the accuracy of the estimate, enough has been established by the history of recent years to satisfy the iron trade that tearing down and rebuilding on a new scale, and the establishing of new standards of efficiency, which are the continuing order in all departments of modern industry and engineering, will make the demands upon iron and steel works greater and greater. What iron and steel manufacturers have been doing steadily, at furnaces and steel works, is paralleled in every line—the discarding of the old, not because it is worn out, but because something better has been found to do the work. It is this feature of our national progress—applying every year a large part of the wealth taken from the ground to the replacement of the equipment with which the country does its work—that makes every prophet of the iron trade a thoroughgoing optimist.

Speaking specifically of railroad buying: There may be postponements now and then, but they are the merest eddies in the current; the head is only so much the greater when the water finally comes to the wheels.

The Centers of Pig Iron Production and of Lake Ore Consumption.

The decision of the Finance Committee of the United States Steel Corporation to study the proposition to erect a large iron and steel plant in the vicinity of Duluth, Minn., following the breaking of ground eight months ago for the large plant at Gary, Ind., raises the question of the trend in iron production toward the source of supply of Lake Superior ores and lends interest to a study of how the centers of production and consumption have shifted thus far.

The two most important influences contributing to such shifting are the rise of the by-product coking process and the relative increase in iron and steel consumption in the West. Beehive coke does not lend itself well to long railroad journeys, and particularly to transfer from one mode of transport to another, as where a lake vessel forms part of the chain. By-product coke has some advantage in this respect, yet perhaps not sufficient to weigh heavily. The inclination to carry on by-product coke making at the point of consumption rather than at the point of coal mining, and the ability of the process to use coking coals which have not found favor with the beehive oven, tend in the direction of allowing the fuel to meet the ore, rather than have the ore meet the fuel. At Gary it is expected that the coke used will be by-product coke made on the ground. There is room for the establishment of blast furnaces at the head of the lakes, using by-product coke made from coal which furnishes a return haul for ore vessels from the various ore receiving ports. One coke furnace is already in that field, and so far as operation is concerned there is no outstanding problem.

It is well understood that the West has increased its consumption of iron and steel much more rapidly than the East. The center of consumption has moved steadily westward, and is now moving rapidly. The movement of the center of production has not been so clear. There has been, indeed, a curious cross current. The year 1890, 17 years ago, was the first in which the pig iron made with Lake Superior ores reached one-half the total for the country. At the present time about three-fourths of the country's pig iron is being made with these ores. It would naturally be supposed that this increase in the consumption of Lake Superior ores would move the center of production westward, and so it has, but there is the curious cross current that the center of consumption of Lake Superior ores alone has moved eastward. At first glance the showing may cause surprise, but the explanation is easily found.

It has been remarked that 1890 was the first year in which half the country's pig iron was made from Lake Superior ores. The previous year almost captured the credit. As the consumption of Lake Superior ore is deferred, on an average, by nearly half a year after its production, the consumption in 1890 may be taken roughly as the average of the production in 1889 and 1890, which average was 8,230,000 gross tons. The production in other parts of the country, in 1890, was 7,090,000 tons, and the imports 1,247,000 tons, there being thus 8,230,000 tons of Lake Superior ores, and 8,337,000 tons of other domestic and imported ores. A scrutiny of the table of pig iron production in 1890 by districts bears out the conclusion that in that year pig iron was made half from Lake Superior and half from other ores.

The balancing point as between the West and the East in pig iron production has been close to the meridian of 80° 30′ dividing Pennsylvania from Ohio. This meridian passes between the two principal producing regions of Virginia, and as the matter is of no consequence in this connection it is arbitrarily assumed for convenience that half the Virginia production has always been Western and half Eastern.

In 1890 the bisecting meridian for pig iron production lay east of the meridian dividing Ohio from Pennsylvania. Putting the Shenango Valley in the West practically establishes the dividing line between this valley and Allegheny County. The meridian bisecting the productions from Lake Superior ores, however, lay to the west of the Ohio-Pennsylvania meridian, so that one-third of the Mahoning Valley should be put in the East to establish a balance.

Sixteen years later, in 1906, we find that the bisecting meridian for all pig iron production has moved Westward to the center of the Shenango Valley, half of that valley's production being put to the West and half to the East. The meridian bisecting production from Lake Superior ores alone, on the other hand, has moved westwardly, so that as regards Lake Superior ores alone one-third the Shenango Valley must be put to the West and two-thirds to the East. If the expression be permitted, it may be said that the center, as regards Lake Superior ores, has in 16 years moved about two-thirds of a valley to the east.

These two cross movements, the center of all production moving westward and the center of Lake Superior production moving eastward, have been due to the same general cause, the replacement for iron making of imported and various local ores by Lake Superior ores. As Lake Superior ores rose some Eastern iron operations suffered, moving the general center westward, but other operations in the East adopted Lake Superior ores, thus moving the center of Lake Superior ore consumption eastward. Some Pennsylvania furnaces merely changed from one ore to the other. One important interest, Lackawanna, changed its base of operations as well as its material, but remained in the East.

The trend in the near future may be forecasted from the furnaces which but lately became productive and those which are now being built. Furnaces which were first blown in during 1906 did not contribute their full quota to that year's production, on which some of the above deductions are based. During 1906 new furnaces were blown in having about 1,310,000 tons annual capacity, of which about 1,145,000 tons, or between 87 and 88 per cent., was of furnaces to use Lake Superior ore. The new construction of 1906, therefore, tended to increase the proportion of consumption of Lake Superior ore. The remaining percentage is too small to merit discussion as to geographical position. Of the Lake Superior ore furnaces 655,000 tons of annual capacity is west of the Ohio-Pennsylvania meridian, and 490,000 tons east of it, so that the new construction of 1906 gives the bisecting meridian a trifling push to the westward, a fact of significance only in that the movement had been theretofore slowly to the East.

Of the new blast furnaces now being built, including also the half dozen which have been blown in since January 1, there are but two not designed to use Lake Superior ore, one Colorado balancing one South Bethlehem. The remaining 95 per cent. or so of the total capacity is intended for Lake Superior ores, about 2,785,000 tons of annual capacity, or almost 57 per cent. of the total Lake Superior, being west of the Ohio-Pennsylvania meridian, and 2,120,000 tons east of it. The Steel Corporation's new construction is preponderatingly west, its eight Gary furnaces more than balancing the two Carrie.

two Duquesne and one McKeesport it is building in Pennsylvania, while west of Pennsylvania it is also building two Ohio and one Lorain. Even the four Aliquippa furnaces of the Jones & Laughlin Steel Company in Pennsylvania will not balance the Steel Corporation's trend to the west of the Ohio-Pennsylvania meridian. The new erection by other interests is preponderatingly in the West, although there is new construction in progress at Erie, Pa., and in the Buffalo District.

It is probably needless to remark that the data cited on new blast furnace erection do not include in any way the rebuilding or enlarging of furnaces. Such an inclusion would be contrary to the spirit of this investigation.

While the trend is thus shown to be unmistakably toward the West, the movement is not rapid. New construction running even into millions of tons cannot move rapidly the center of production of a country which last year made more than 25,000,000 tons of pig iron, and has since increased that rate. The direction of movement of the dividing meridian has changed, however, from eastwardly to westwardly and will probably not change again very soon. The data given above proved only that from 1890 to 1906 the movement of the Lake Superior bisecting meridian was eastwardly, and it is therefore pertinent to remark at this point that it is only now that the reversal is occurring, as in 1905 the new construction moved it eastward. In that year eight absolutely new furnaces were blown in; two were in the South; the remaining six were tributary to Lake Superior ores; four of these were in western Pennsylvania and at Buffalo, and but two were west of the Ohio-Pennsylvania meridian, one being at Lorain, while one small charcoal stack was started in Michigan.

At present the trend toward the West or Northwest is distinct, but not very rapid. The conclusions to be reached regarding the establishment of iron making on a large scale at the head of the lakes will be watched with interest. The feeling is so strong that it is largely on account of the rapidity of growth of iron and steel demand in the West that local production has failed to keep pace with it, that it may be remarked that *The Iron Age* of December 18, 1890, contained an article on the steel rail trade which gave the productive capacity of the then recently formed Illinois Steel Company at 925,000 gross tons out of a total in the country of 2,600,000 tons, or well over one-third. That is probably a better showing than the statistics of last year would make. Pig iron has thus far been produced so largely in the East because the producers had reasons for making it there, outside of the problems of distribution.

The Connecticut Brass Industry.

The brass industry of Connecticut is experiencing a period of prosperity which has had no parallel in the past and which sees no sign to indicate a change, unless it be for the better. The American Brass Company and the other great brass manufacturers have materially increased their equipment, yet manufacturing facilities are still insufficient. Prices of brass have advanced with those of copper, spelter and tin, but apparently without effect upon the demand. The volume of business, reckoned in values, has grown to extraordinary proportions, and in tonnage the increase in 1906 ran beyond any other year, though no definite figures are available to show just what the actual gain has been in these respects. Taking as a basis the year's business of the American Brass Company, known to have been a very profitable one, running up to a total exceeding all previous records, it is to be presumed that the industry as a whole reached a high water mark of profit which had never before been touched. The American Brass Company does not publish the figures of its business, and nothing definite can be given to show what the year actually brought to this great corporation, but enough has become known to the public to afford a basis of estimate, and to admit of a prophecy that if the first two months of 1907 are any criterion the present year will be a most gratifying one to the owners of all classes of brass manufacturing establishments.

The Connecticut Bureau of Labor Statistics has just issued a report which contains significant figures concerning the manufacture of brass goods. As the names of the 85 manufacturers who returned schedules to the bureau are withheld, it is not certain that the figures of the American Brass Company are included; the totals, however, do not appear large enough to make their inclusion probable. Unfortunately the figures are those of 1904 and 1906, no statistics having been obtained in 1905; and as comparisons are in total values of manufactured products a large allowance must be made for the advance in prices of raw materials, which in the two years' interval was very marked in this branch of industry. Nevertheless, the report is of much interest.

The business of brass and brass goods manufacturing in the State increased 43.2 per cent. in these two years. The 85 manufacturing establishments included in the report (which does not cover the entire industry) showed a gain in gross value of products of $25,702,722. The total in 1904 was $59,487,181; in 1906 it was $85,189,903. The increase in the number of people employed in these same works was but 12.8 per cent., or from 25,797 to 29,090; and the amount paid in wages advanced but 16.3 per cent., or from $13,459,000 to $15,659,000. Undoubtedly an important part of the disparity between the gain in value of product and the increase in payroll is due to the greatly increased cost of raw materials. The following table, showing a comparison of the gross value of products manufactured in 1904 and 1906 by the 18 companies, making over $1,000,000 in the latter year, has been compiled from the report:

Comparison of the Larger Companies.

Gross value of products.—1904.	Gross value of products.—1906.	Per cent increase or decrease.
$7,899,610	$13,247,729	Inc. 67.7
4,871,441	10,300,498	Inc. 111.4
5,874,544	8,671,832	Inc. 47.6
4,500,000	7,986,988	Inc. 77.5
5,207,505	6,057,740	Inc. 16.3
2,500,000	4,064,528	Inc. 62.6
2,284,066	3,570,933	Inc. 56.3
1,802,047	2,630,843	Inc. 46
1,519,055	2,183,491	Inc. 43.7
1,245,629	1,964,306	Inc. 57.7
1,975,290	1,803,598	Dec. 8.7
1,000,000	1,500,000	Inc. 50
1,100,000	1,315,000	Inc. 19.5
1,325,000	1,305,000	Dec. 1.5
800,000	1,104,155	Inc. 38
623,759	1,079,381	Inc. 73
1,240,650	1,043,175	Dec. 15.9
1,140,000	1,018,598	Dec. 10.6

It is significant that the very large companies, those doing an annual business of more than $3,000,000, show a greater gain in gross value of products than most of the smaller establishments. The seven companies included in this class did a gross business of $33,137,000 in 1904 and of $53,900,000 in 1906, a gain of more than $20,000,000, or 62.8 per cent. On the other hand, some of the small companies exceeded this percentage of gain by a wide margin. One group of 14 such concerns showed an average gain of 142.7 per cent. It does not follow that the greater the gross business the greater the net, but in the present market it would be presumed that the two

figures would run along parallel lines. Then, too, it must be remembered that the figures jump from 1904 to 1906, and doubtless the fact that an average is struck between a year of moderate business and one of wonderful prosperity must be taken into account in making deductions. The list tells the story in some cases of declining business as well as increasing.

The opinion in the Naugatuck Valley is that the immediate future is most promising. Copper is purchased for the first six months of the year, and there appears to be little anxiety concerning the spelter and tin situation. There is no worry over the last half of the year, few contracts having been placed for that period. The work of adding to the mills proceeds conservatively, as always, but steadily. The American Brass Company is continuing its policy of concentrating the production of its different departments at its several works, which will mean a still greater economy of manufacture. The shops which furnish the brass people with machinery are rushed to the limit, providing for increases in the equipment of their customers. No great enlargements of works nor new works are looked for this season, though one such project is suspected as coming to a fulfillment in the comparatively near future.

CORRESPONDENCE.

The Use of Ferrosilicon in Foundry Ladles.

To the Editor: I notice a communication in *The Iron Age* of March 7 from J. E. Johnson, Jr., in which he attacks the validity of a patent granted to me for changing at will, within certain limits, the character of molten cast iron by adding small amounts of high grade ferrosilicon in the ladles. Mr. Johnson bases his claim on the ground that in the published accounts of my experiments I have stated that I commenced these investigations in 1895, and that he had done the same thing in 1894.

In the first place, I have made no such statement and would thank Mr. Johnson if he will produce any publication in which the date he refers to is given. In my paper on "The Beneficial Effects of Adding High Grade Ferrosilicon to Cast Iron," presented at the convention of the American Foundrymen's Association at Cleveland, Ohio, June 5 to 7, 1906, and printed in their *Transactions*, I said:

"In the year 1886 the author made many experiments in this direction, using the richest grades of ferrosilicon then obtainable, containing from 10 per cent. up to 18 per cent. of silicon, by adding the alloy in small lumps, or in powder, to ladles of molten iron, but found that the metal would not dissolve a sufficient quantity of the alloy to change greatly the proportion of silicon and thus to produce a marked increase in softness of the iron without appreciably affecting the temperature and fluidity of the molten iron. Preheating the alloy was the next logical step tried with an improved result, but it was soon ascertained that the inconvenience and cost of heating the alloy red hot would militate against its general usefulness."

In making large castings from "direct metal," *i. e.*, molten iron as it runs from the blast furnace, (not from pig iron melted in a cupola, as in foundry practice,) where it is not essential that the iron shall be very hot and fluid when poured into the molds, it is, of course, possible to add a considerable amount of the ordinary ferrosilicon of commerce containing from 10 to 20 per cent. of silicon in the large ladles. This is a very different proposition from that of making fine castings in foundries where hot and fluid metal is absolutely necessary to obtain good work.

Mr. Johnson has apparently made another error in his dates, for he states: "I am informed, moreover, by I. E. Johnson, that at Lockport, N. Y., in 1888, he was shown samples of ferrosilicon made in the electric furnace, which he was told was intended for use in softening hard iron." In 1888 I caused inquiries to be made, far and wide, for ferrosilicon alloys containing over 20 per cent. of silicon, but found none, and no ferrosilicon was made in any electric furnace until many years later, and it is all imported to this day, according to my belief. Whether this be true or not, it is quite evident that young Mr. Johnson does not realize the vast difference between making crude castings from "direct metal" and the fine work produced in first-class foundries. He seems to have performed successfully in 1894 the identical metallurgical operation with direct metal that I tried unsuccessfully with foundry iron in 1886.

ALEXANDER E. OUTERBRIDGE, JR.

PHILADELPHIA, March 7, 1907.

Cyanogen and Dry Air Blast.

To the Editor: Though there has already been a great deal of published discussion of the Gayley dry air blast it is surprising that one point has not yet had attention. That the dry air blast is advantageous there can be no doubt. To my mind there is no doubt, moreover, of the correctness of the results as published; otherwise they would not have been given currency. But why has nobody yet touched on the question of cyanogen in the lower part of the blast furnace? I believe the percentage of this gas in the lower portion of the furnace has been changed by the use of the Gayley dry air blast. It would certainly be worth while for those interested to have careful chemical analyses made with the view of determining which of two furnaces under the same conditions will show the greater amount of cyan gases, say, one, two and three hours after the closing of the taphole, the one furnace using the Gayley dry air blast and the other ordinary air blast. The publication of analyses of such gases taken only a few feet above the tuyeres would doubtless reveal the existence of different combinations varying with the hight above the tuyere level. P. E.

DU BOIS, PA.

The Philadelphia Foundrymen's Association.

Quite a representative attendance of both local and out of town members was seen at the regular monthly meeting of the Philadelphia Foundrymen's Association, held at the Manufacturers' Club, in that city, on the evening of March 6. Vice-President Alexander E. Outerbridge, Jr., occupied the chair. The report of the treasurer showed the finances of the organization to be in a very satisfactory condition, there being a balance of over $2500 on hand, with all bills paid. The committee for the entertainment of the American Foundrymen's Association and its allied organization, at the convention to be held in Philadelphia, May 20-24, reported that a number of features were under consideration, but not definitely decided upon as yet. The Bellevue-Stratford Hotel was decided upon as the official headquarters of the convention.

A discussion as to the present condition of the foundry trade, as well as the prospects for the future ensued, in which practically every foundryman present took part. The consensus of opinion was that the volume of business was the greatest the trade has ever known. Many foundries are totally unable to handle the business offered, and a large number have their full capacity covered for a long time ahead. Difficulties in obtaining supplies of pig iron were being experienced in a number of cases, and many foundrymen are using foreign irons to make up for the scarcity of domestic irons for spot delivery.

The paper before the association for the evening was entitled, "Improving the Properties of Steel Castings," by W. A. Pollock Davis, Philadelphia, Pa. This paper briefly treated of the use of tungsten, manganese, nickel and molybdenum. In the subsequent discussion it was said, while the use of these elements in gray iron castings had not yet been largely exploited, experiments were now also being conducted along that line with an encouraging degree of success. Following adjournment, a luncheon was served at the conclusion of which brief remarks were made by a number of those present.

The Trademark Law Amended.

WASHINGTON, D. C., March 9, 1907.—In the closing hours of the Congress just ended a bill was passed providing for the amendment of the so-called Bonynge Trademark act of February 20, 1905, with a view to the further protection of the owners of trademarks to which title is claimed either under the statute or the common law. Other important trademark legislation sought during the final month of the session failed of enactment in either House. The measure passed by Congress was introduced by Representative Brick of Indiana, and provides for the amendment of section 6 to read as follows the proposed addition to the law being indicated as italics:

Sec. 6.—That on the filing of an application for registration of a trademark which complies with the requirements of this act, and the payment of the fees herein provided for, the Commissioner of Patents shall cause an examination thereof to be made; and if on such examination it shall appear that the applicant is entitled to have his trademark registered under the provisions of this act the Commissioner shall cause the mark to be published at least once in the *Official Gazette* of the Patent Office. Any person who believes he would be damaged by the registration of a mark may oppose the same by filing notice of opposition, stating the grounds therefor, in the Patent Office within 30 days after the publication of the mark sought to be registered, which said notice of opposition shall be verified by the person filing the same before one of the officers mentioned in section 2 of this act. *An opposition may be filed by a duly authorized attorney, but said opposition shall be null and void unless verified by the opposer within a reasonable time after such filing.*. If no notice of opposition is filed within said time the Commissioner shall issue a certificate of registration therefor, as hereinafter provided for. If on examination an application is refused, the Commissioner shall notify the applicant, giving him his reasons therefor.

The Necessity for the Change.

The necessity for this modification of the existing law results from the enormous expansion of the trademark registration system, brought about by the enactment of the Bonynge act, under which many thousand registrations are now annually made. In the search for novel marks with which to protect new products many manufacturers in good faith have inadvertently adopted symbols and devices already in use and claimed by other producers under the Federal statute or the common law. In other cases unscrupulous manufacturers, or persons claiming to be manufacturers, for the purpose of raising issues in the hope of forcing money settlements in compromise have filed applications for trademarks closely resembling marks already in use, relying upon technicalities to prevent the rejection of their claims by the Patent Office authorities.

Under the present law the owner of a legitimate trademark may enter an "opposition" to the allowance of such a claim, but he must do so within 30 days after the publication of the mark sought to be registered and must do so in person. This requirement often operates to defeat the contention of the opposer, who, for various reasons, may not be able to comply with the letter of the law. The conditions that have thus frequently resulted, and the proposed operation of the amendment as a remedy are set forth as follows in the report of the House Committee on this measure:

It sometimes happens that the person desiring to oppose the registration of a mark is absent in a foreign country or may reside in some of our insular possessions, and 30 days' notice is not sufficient in such cases to enable him to verify the notice of opposition and file same. For this reason it is deemed advisable that a duly authorized attorney should be permitted to file the notice of opposition, and within a reasonable time thereafter the opposer be required to verify the notice of opposition. Unless the opposition is thus verified it becomes null and void. It is impossible to lay down hard and fast rules as to what would be a reasonable time in each case, and consequently that matter is left to the discretion of the Commissioner of Patents.

Congress Opposes a Criminal Statute.

The advocates of the enactment of a Federal statute making the infringement of a trademark a criminal offense made a final effort during the closing month of the session to secure the passage of a bill which had been pending throughout the Congress but without success. The arguments presented in favor of this legislation were logical and forcible, and would be entirely convincing but for the deep-seated reluctance of both Senators and Representatives to add to the constantly growing category of criminal offenses under the Federal laws. This feeling was relied upon by the opponents of this proposed legislation to defeat it and their hopes were fully justified by the outcome.

For many years an important contingent of patent experts, aided by various bar associations, has sought to induce Congress to enact a measure providing for the severe punishment of all willful infringers of legitimate trademarks. It has been argued with much force that in many cases these marks are of great financial value and constitute a form of property entitled to the same degree of protection that is afforded to personal property and chattels of all kinds. Instances have been cited where a single trademark representing the good will of a long established business has been sold for an enormous sum of money, and it has been urged that no measures enacted for the protection of such property could be regarded as too drastic in its character, provided it were properly safeguarded to prevent the miscarriage of justice. Illustrations have also been presented to the committees of Congress of infringements that have been made with impunity because of the knowledge on the part of the infringer that the severest punishment to be inflicted under the Federal law would be a relatively small fine in the form of damages, the payment of which might be indefinitely postponed by ingeniously contrived litigation. The case thus made has been very strong, and under some circumstances would doubtless have moved Congress to enact the desired legislation.

During the past few years, however, Congress has added one crime after another to the list of offenses punishable in a Federal action brought against the person, and the tendency to pass such laws has progressed at a rate that suggests an early checking of the movement if the States are not to be deprived of all their police powers. The most experienced and thoughtful men in both Houses believe that the time has come to call a halt in this type of legislation, and they therefore decided not to give serious consideration at this time to the trademark bill referred to.

W. L. C.

The American Galvanizing Company.

A company is now being formed by H. W. Poor & Co., 33 Wall street, New York, named the American Galvanizing Company, for the purpose of introducing in this country the process of dry galvanizing which is known as Sherardizing. This new process of galvanizing is in successful use in Great Britain and Germany, and has received considerable attention in the technical press. In this process the articles to be galvanized are placed in a closed iron receptacle filled with zinc dust and heated to a temperature of 500 to 600 degrees F. (200 to 300 degrees below the melting point of zinc) for a time varying from a few minutes to several hours, according to the size of the article treated, and are then allowed to cool. The articles treated are then found to be coated with a fine homogeneous covering of zinc, the thickness of which is dependent upon the temperature and the time for which the article has been treated. The covering effected in this manner is not merely superficial, but is claimed to be alloyed into the surface of the article treated. It is then impossible to separate the zinc either chemically or mechanically without removing the original surface of the article treated. It is claimed that by this process the required plant is much cheaper than a plant for hot galvanizing; a great saving in fuel and labor is effected; a less amount of zinc is required; a coating of any desired thickness can be given; the surface is much smoother; a high polish equal to nickel plate can be given at very little cost; there is no loss in temper or of tensile strength; screws do not require to be rethreaded after treatment; large articles, such as structural shapes, can be treated.

As numerous inquiries have been received from iron and steel manufacturers in this country desiring to know whether the Sherardizing process is being handled by any parties on this side of the Atlantic the above information will be of considerable interest to the trade.

Plans for Internal Revenue and Customs Inquiries.

WASHINGTON, D. C., March 12, 1907.—Since the adjournment of Congress on the 4th inst. a resolution adopted by the Senate in the closing days of the session has attracted considerable attention. It was reported from the Finance Committee by Chairman Aldrich and authorized that committee to investigate, during the recess, internal revenue and customs matters, &c., and to hold sessions at such times and place as may be deemed advisable. The text of the resolution is as follows:

Resolved, That the Committee on Finance be, and they are hereby, authorized and directed, by subcommittee or otherwise, to make an investigation of internal revenue, customs, currency and coinage matters, and to report from time to time to the Senate the result thereof; and for this purpose they are authorized to sit, by subcommittee or otherwise, during the recess or sessions of the Senate, at such times and places as they may deem advisable, to send for persons and papers, to administer oaths, and to employ such stenographic, clerical and other assistance as may be necessary, the expense of such investigation to be paid from the contingent fund of the Senate.

The Object of the Resolution.

At first glance the form of this resolution suggests the idea that the leaders of the Finance Committee have determined to investigate some phase of the tariff question during the recess, possibly with the intention of taking preliminary steps toward a general revision of the Dingley act. Such, however, is not the purpose of the committee. Senator Aldrich, who is now about to sail for Europe for an extended absence, stated to the correspondent of *The Iron Age* that the committee did not propose to take up the general subject of tariff revision, but that the resolution was adopted to put the committee in position, should it be deemed advisable, to hold sessions during the recess, employ experts and a clerical staff, &c., to give preliminary consideration to any revenue question which might seem likely to be the subject of legislation in the new Congress.

There are several matters now pending which make it especially important that the Finance Committee should be in position to hold sessions during the coming summer. The new free alcohol law has just gone into force, and the Senate leaders are watching developments thereunder with close attention. The only real apprehension concerning the free alcohol policy which Congress has now adopted grows out of the exceedingly high tax on beverage spirits, which, of course, affords a great inducement to illicit distillation and to the reclamation of pure alcohol from denatured mixtures. No foreign country in which industrial alcohol is permitted to be used free of tax places such a high impost upon beverage spirits as is levied in the United States. In Germany, where the use of denatured spirits is more extensive than in any other country in the world, the tax is approximately 74 cents per proof gallon, while in this country it is $1.10.

Should the general use of denatured alcohol in the United States result in considerable frauds upon the revenue, the Finance Committee will be called upon to consider the advisability of reducing the beverage spirit tax, with a view to removing the incentive for illicit operations. Several members of the committee have long entertained the opinion that the tax is now above the revenue point and that if it were reduced to 90 cents, or even 70 cents, per gallon it would net a larger revenue in addition to relieving the internal revenue service of the very difficult task of suppressing moonshine traffic.

The German Tariff Situation.

The Finance Committee leaders are also watching with much interest the outcome of the negotiations with Germany relative to the application to American products of the new German tariff. The members of the North Customs Commission have returned to the United States, and while no official statement has thus far been made regarding the feeling of the German Government, because of the adjournment of Congress without modifying the customs administrative laws, there is excellent authority for the statement that a *modus vivendi* has been agreed upon, under which our products will continue to enjoy most-favored-nation treatment until July 1, 1908. This extension has been made, however, for the sole purpose of enabling the Administration to prepare a comprehensive project for submission to Congress, embracing not only important changes in our customs administrative laws, but also a series of tariff concessions amounting to a reciprocity treaty of no little importance.

It is not believed that these proposed concessions will be made to include the general schedules of the Dingley act, but merely a number of items of special interest to German producers and exporters, and it is the present plan to ask Congress to add these items to those already embodied in section 3 of the Dingley act, under which half a dozen minor reciprocal trade agreements have already been concluded and put into force. The legislation necessary to bring about this object would be simply the passage by both Houses of a joint resolution adding the items referred to to section 3 of the tariff act. Thereafter the President could grant the concessions to any foreign country in consideration of reciprocal advantages afforded the trade of the United States, and it would not be necessary to submit such agreements to the Senate for ratification. Any proposition to amend section 3 of the Dingley act is of the deepest interest to the Finance Committee leaders, and, although all tariff legislation must originate in the House, it goes without saying that Senator Aldrich and his colleagues will have far more influence in shaping the proposed policy than the comparatively inexperienced men who now constitute the majority of the Ways and Means Committee.

The Application of the French Tariff.

The Finance Committee leaders are also following with close attention the attitude of the French Government, which according to official advices received here is planning to impose the maximum rates of the French tariff on American products. Ever since the enactment of the Dingley law, 10 years ago, the State Department has endeavored to secure the ratification by the Senate of a reciprocity treaty negotiated by Commissioner Kasson, but without success. From time to time the convention has expired, but has been renewed in the hope that the Senate would modify its views. At the present time, however, the agreement is dead, and the State Department is unable to give such assurances to the French Government as to warrant its further extension. It has been suggested that the matter may be referred to the North Commission for further negotiations, but until the commission's final report with regard to the German tariff has been received no steps with reference to the French situation are likely to be taken. W. L. C.

An Electric Steel Plant in Canada.

We have the information from a reliable source that a company has been formed in Canada, to be located near Niagara Falls, for the purpose of smelting ores and to produce steel and steel castings by the Héroult process. Everything will be done by electric power. It is expected that the plant will be in operation by about August, 1907. It will also be used as a demonstrating plant to show the process to intending licensees. An experimental department will be added to experiment further with smelting and treating all kinds of ores by the Héroult electric process.

There are now four European plants operating under Héroult patents. They have demonstrated the fact, within a comparatively short time after starting, that steel and steel castings can be made by the Héroult patent process more economically and of better quality than by any other process now practiced. All the plants now running are without exception a commercial success, exceeding all expectations.

Correction.—The import figures for iron ore given last week, forming part of the article entitled "January Iron and Steel Exports and Imports," were incorrect. The January imports were 87,100 gross tons, of which 52,300 tons came from Cuba, 20,445 tons from Europe and the remainder from countries not specified. The imports for January, 1906, were 97,617 tons.

Recent Customs Decisions.

Parts of Rifles.

The Board of United States General Appraisers has decided that telescopic sights designed and adapted only for use with a particular rifle are properly dutiable at 25 per cent. as "parts of rifles," as that term is used in the tariff law. Collector Stranahan of New York assessed the sights, which were imported by Von Lengerke & Detmold, as "telescopes," with duty at 45 per cent. The decision says that the sights are not interchangeable with other rifles, and are attached to and form a part of the firearms prior to exportation. The board holds that the present case differs from a former issue raised wherein certain rubber recoil pads were held by the Federal courts not to be essential or necessary attachments for, or parts of, guns. While the pads contributed in no way to the efficiency of the rifles, the sights, it is held, are imperative for the handling of the guns.

The Steel Wool Case.

Both the Government and the Buehne Steel Wool Company have met with defeat in the United States Circuit Court at New York, where Judge Hough has handed down decisions in cross appeals regarding the classification of steel wool. The controversy over the duty to be paid by importers on this line has raged for several years, but none of the decisions of the judiciary so far proved acceptable to either of the litigants. When the case was before the Board of General Appraisers that tribunal held the merchandise to be dutiable under paragraph 135 of the tariff law relating to forms and shapes of steel. On the other hand, the importers insisted that the article is manufactured from steel wire and therefore dutiable under paragraph 137.

The wool had been assessed by the Collector at the rate of 45 per cent. under paragraph 193, which provides for manufactures of metal. The board, however, set aside this classification and made a ruling unsatisfactory to both parties. Judge Hough now holds that the finding of the General Board is correct. He therefore denies the claims of the importers and of the Government. The appeal of the Treasury Department was based upon evidence, which, it was held, showed that hitherto the Federal courts and the Board of Appraisers have not given sufficient importance to the nature of the articles specifically enumerated in paragraph 135.

It was urged that if due consideration had been given to the subject it would have appeared that the catalogue of articles in that paragraph comprises the under or simpler products of a rolling mill. Accordingly the Government maintained that the "catch all" clause should not be extended to include so highly manufactured an article as that under consideration. The court states that the issue is one for the high appellate tribunals.

The rulings made by the Circuit Court will have the effect of prolonging a litigation which already has extended over three years. Influential domestic interests fear the competition of the foreign wool, and the Government will be asked to continue the judicial proceedings in the higher courts in the hope of finally winning the contention for the 45 per cent. duty. Until the final agreement has been reached all importations will be taxed under paragraph 193.

Sheet Steel in Strips.

Judge Hough, in the United States Circuit Court, has sustained the contention of Hermann Boker & Co., New York, that sheet steel in strips is properly dutiable under the provisions in the tariffs of 1894 and 1897 for forms and shapes of steel. The merchandise was classified under the provisions in these laws for flat steel wire or sheet steel in strips. This issue has been before all of the courts with the exception of the Supreme Court, the present case having been made up for trial on a new record at the instance of the Government. The decision, in part, says:

"It is not denied that the exact article now under consideration has been held by the Circuit Court of Appeals to be dutiable as 'steel in all forms and shapes,' under paragraph 135, but the Board of United States General Appraisers has departed from that ruling because it believed that the testimony there presented was 'grossly misleading.' The decision below is, I think, reached by accepting as accurate Boker's statements when they agree with the contention and rejecting them when they do not. Upon the evidence other than Boker's, I think the conclusion reached by the Court of Appeals was fully warranted."

Labor Notes.

It is stated that the president of the Iron Molders' Union has requested the Buffalo local to authorize a proposition to all the foundrymen in that city to give the striking molders places alongside of independent workmen in the 12 foundries from which the molders went on strike in May, 1906.

Seventy-five union molders and coremakers from four jobbing and machinery foundries in Moline, Ill., and one in Davenport, Iowa, are out on a strike, due to the refusal of union men to sign individual agreements which have been in use in all departments of these foundries since the strike of 1903. Most of the men went out in January. They were reinforced last week by 110 molders and coremakers employed in large implement works at Moline, the cause of this strike being the same as for the earlier one.

At Detroit, Mich., 28 molders and coremakers employed by the Great Lakes Engineering Works went on a strike in February because an apprentice had been discharged for suddenly cutting down his output 50 per cent., presumably under instructions of the shop committee. The company has announced its intention of conducting an open shop.

The Standard Tin Plate Company, Canonsburg, Pa., has refused to sign the Amalgamated Association scale, and as a result that organization has declared a strike. However, the company anticipates no trouble in holding its complement of men. It is operating its tin plate plant to practically full capacity.

The International Brotherhood of Boiler Makers and Steel Shipbuilders ordered a strike at the yards of the American Shipbuilding Company on the Great Lakes and at the Ecorse yard of the Great Lakes Engineering Works, Detroit, effective March 11. Six classes of labor are involved. The men employed at the Lorain and Chicago yards of the American Shipbuilding Company went on a strike the week previous. The strikers asked for a nine-hour day and an advance in wages, in addition to the arrangement of a scale which will make wages the same at all the yards for the same class of work. The present workday is 10 hr. It is stated that the American Shipbuilding Company offered an advance in wages ranging from 5 to 10 per cent. An officer of the company states that not more than 2000 men obeyed the strike order, though the officers of the union claim that the total number of strikers will reach 5000.

A Toledo, Ohio, dispatch says that the strike at the Pope Motor Works was ended March 11, an agreement having been reached on disputed points. The men returned to work on March 12.

At a meeting of puddlers from the Pittsburgh, Connellsville, Youngstown and neighboring districts, held in Pittsburgh March 10, a resolution was passed to withdraw from the Amalgamated Association, alleging mismanagement of the organization. It is probable that the puddlers, who have organized under their old name of the Sons of Vulcan, will present their own scale to the manufacturers when the time comes to take up wage scales for the year commencing July 1. It is not unlikely that they will demand higher wages, owing to the scarcity of puddlers.

PERSONAL.

R. C. Frampton, formerly secretary and sales manager of the Ruud Mfg. Company, Pittsburgh, manufacturer of automatic water heaters, is now president and general manager of the Pittsburgh Water Heater Company, organized with a capital stock of $250,000, and which expects to place on the market about September 1 a line of water heaters.

Thomas B. Riter, president of the Riter-Conley Mfg. Company, Pittsburgh, builder of steel plate construction, is seriously ill.

George K. Preston, for some years private secretary to A. C. Dinkey, president of the Carnegie Steel Company, has been appointed to fill the position occupied by the late Homer J. Lindsay.

A. R. Forsyth, cashier of the First National Bank, Birmingham, Ala., has been elected treasurer of the Southern Steel Company, succeeding G. H. Schuler.

James Kindred, proprietor of Boynton & Plummer, Worcester, Mass., sailed for southern Europe March 9, taking a much needed rest.

Charles F. Brooker, president of the American Brass Company, will sail for Europe March 16, to be absent two months.

William C. Snow, manager of the New England branch of the Schutte & Koerting Company, manufacturing engineer, Philadelphia, has moved his office from 195 Oliver street to 43 High street, Boston.

Ralph W. Bacon, superintendent of the structural department of the Bethlehem Steel Company, has resigned to accept the general superintendency of the Robins Conveying Belt Company, New York, with works at Passaic, N. J.

Randolph Marshall, formerly connected with the Richmond branch of the American Locomotive Company, has been transferred to the position of superintendent of the Brooks Locomotive Works, owned by the same company, at Dunkirk, N. Y.

Archibald Johnston, president of the Bethlehem Steel Company, South Bethlehem, Pa., has returned from a two months' business trip to Europe.

R. H. Wilkinson, superintendent of the Niles Furnace of the Carnegie Steel Company, delivered a most interesting address on the progress of the iron trade of the United States before the Up-to-Date Club, Youngstown, Ohio, on the evening of March 7. In the course of his address he referred to the great expansion now being made in the iron industry of the Mahoning Valley and said that the rate of increase in that valley in the next two years will be almost double that of the country at large.

A. L. Hastings, who has occupied responsible positions in the manufacturing department of the Pressed Steel Car Company, has severed his connection with the company and for the time being has taken up his residence in Atlantic City, N. J. Upon his departure from the works he was the recipient of a testimonial from his associates.

S. F. Long, formerly assistant chief engineer of the Mesta Machine Company, Pittsburgh, has resigned to take charge of the engineering department of the American Roll & Foundry Company, Canton, Ohio.

Robert E. Carrick, formerly general superintendent with the Unit Concrete-Steel Frame Company, Philadelphia, and more recently with Tucker & Vinton, New York, in the capacity of general engineer, has joined the engineering corps of the General Fireproofing Company, Youngstown, Ohio. His interest will be centered in the sale and installation of pin connected girder frames.

H. C. Bair, president of the Bair & Gazzam Mfg. Company, engineer and machinist, Pittsburgh, has resigned and has been succeeded by S. W. Vandersaal.

C. W. Lytle, superintendent of the Pittsburgh plant of the American Steel Foundries, has been appointed district manager to succeed Harry Wright, recently elected president of the Ohio Steel Foundry Company, Lima, Ohio.

OBITUARY.

N. CARMAN DUNN of the Dunn-Eldridge Company, Philadelphia, died March 4, aged 62 years. He was born in Plainfield, N. J., and removed to Philadelphia 25 years ago, embarking in the brass business, from which the present company grew. He leaves a widow, two daughters and two sons.

MAHLON HOAGLAND, SR., died March 7 at Rockaway, N. J., aged 90 years. He was born in Dover, N. J., and when a young man started a foundry and machine shop at Rockaway, which is now conducted by the M. Hoagland Sons Company, of which he was president. He leaves a son and three daughters.

LEONIDAS PRESTON, Eastern manager of the Timken Roller Bearing Axle Company and vice-president of the Hewitt Motor Company, died March 7 at the Hotel Cumberland, New York, under circumstances indicating suicide. He was a native of Dallas, Texas, was 46 years of age and had resided in New York eight years. He leaves a widow.

PROF. HENRI MOISSAN, the famous French chemist, is dead.

Explosion of a Cast Iron Water Brake.—An unusual cause of an explosion of cast iron revolved at high speed was given in an inquest upon the bodies of two engineers employed by Willans & Robinson, Rugby, England. The managing director of the company said that the design of the water brake which exploded came from an engineer in the United States, and the drawings were passed to the chief draftsman to be copied. This having been done, the tracing was sent into the shops, and by inadvertence was not checked. Thus it was not noticed that cast iron was marked for the drum, when, according to the original drawings, it should have been cast steel. The drum, measuring about 3 ft. in diameter, would have been perfectly safe if run at a speed not exceeding 750 rev. per min.; or had it been half the diameter it would have been safe for 1500 rev. per min. The wheel was designed to revolve at 1800 rev. per min., and on the day of the accident actually ran at 1500 rev. per min., and it was calculated that if the metal in the rim were unable to bear safely a stress of 3.3 tons per square inch, it would be certain to fly asunder. A test of one of the fragments of the rim showed that the factor of safety was only about 2.80, and it was testified that in machinery of this kind it should be not less than 6. If the wheel had been of cast steel its factor of safety would have been about 6.70, and it would have safely performed the work allotted to it. The explanation of the accident was that by some extraordinary oversight the wheel was made of cast iron, which was quite incapable of holding together against the heavy centrifugal forces.

The United States Geological Survey calls attention to the fact that phosphorus is now being manufactured in this country from mineral deposits. The place where it is produced is in the vicinity of Mount Holly Springs, about 10 miles southwest of Harrisburg, Pa., where a deposit of wavellite occurs in white clay associated with manganese and iron ore. Small quantities of phosphorus had previously been obtained from phosphorite and from apatite, but wavellite, which is aluminum phosphate, has never before been used commercially in the manufacture of phosphorus, as the mineral generally occurs but in limited quantities. The deposit which is now being worked contains the wavellite in pure form not known to occur elsewhere in sufficient quantity to be mined. Hitherto phosphorus has been made solely from bones and organic substances.

A dispatch from Portsmouth, Ohio, says that 75 employees of the Portsmouth Steel Company went out on a strike because their foreman rode on a street car when the trolley men were on a strike.

Pig Iron Production Increasing.

February, with 28 days, naturally did not reach the January total of pig iron production, our statistics showing 2,045,068 tons of coke and anthracite iron, against 2,205,607 in January. But the February rate was greater than that of January—73,028 tons a day against 71,148 tons, or a gain of 1880 tons a day. Due to this increased rate, owing in part to better working and in part to the larger capacity of furnaces blowing in last month than of furnaces blowing out, the weekly capacity of the 319 active coke and anthracite stacks had risen to 511,035 tons on March 1, as compared with 492,359 tons for 317 furnaces on February 1. The steel works furnaces contributed nearly all the increase in average daily production in February, or specifically 1700 tons out of the 1880 tons a day gain over January. The following table gives the production of the coke and anthracite furnaces in February, together with the figures for the four months preceding. The February output was 151,000 tons more than that of February, 1906, which was 1,894,032 tons:

Monthly Pig Iron Production—Gross Tons.

	October. (31 days)	November. (30 days)	December. (31 days)	January. (31 days)	February. (28 days)
New York....	139,868	134,902	134,393	136,057	126,055
New Jersey...	32,297	34,697	33,057	34,323	29,616
Lehigh Valley	51,224	49,636	52,868	58,930	51,485
Schuylkill Val.	50,375	57,649	62,741	62,118	57,388
Lower Susquehanna and Lebanon Val.	65,231	62,016	61,481	58,101	53,010
Pittsburgh Dis.	567,662	509,211	525,312	505,514	481,868
Shenango Val.	150,019	155,698	172,604	171,830	154,966
West. Penn...	116,588	116,732	124,007	122,641	111,933
Md., Va., and Kentucky....	89,280	86,841	85,520	87,919	83,135
Wheeling Dis.	112,022	126,796	128,294	102,158	98,929
Mahoning Val.	186,983	187,261	187,577	196,426	168,187
Central and North. Ohio.	149,339	173,444	162,930	172,031	171,838
Hocking Valley and Hanging Rock.....	33,753	35,690	35,509	31,911	33,606
Ill.,Mich.,Minn., Wis., Mo., and Colo.....	264,966	265,893	290,281	283,934	259,964
Alabama.....	143,254	150,506	139,432	145,233	126,642
Tennessee, No. Caro., Texas and Georgia.	43,947	40,093	39,309	36,481	36,446
Totals.....	2,196,808	2,187,665	2,235,306	2,205,607	2,045,068

To the above total for February about 33,000 tons is to be added for the output of charcoal iron.

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Jones & Laughlin, La Belle, Bethlehem, Calumet and Colorado companies show the following totals of products month by month. We present also separately monthly figures of the production of spiegeleisen and ferromanganese, which is included in the total:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.			Spiegeleisen and ferromanganese.	
	1905.	1906	1907.	1906.	1907.
January	1,129,042	1,358,015	1,406,397	26,305	21,477
February	1,027,937	1,226,760	1,317,923	26,988	19,444
March	1,232,255	1,400,395	.....	23,595	....
April	1,222,710	1,333,591	.....	28,054	....
May	1,287,438	1,372,423	.....	29,447	....
June	1,149,404	1,293,437	.....	22,737	....
July	1,114,409	1,323,391	.....	20,153	....
August	1,186,050	1,237,485	.....	18,327	....
September	1,262,033	1,264,380	.....	24,078	....
October	1,370,960	1,452,200	.....	23,517	....
November	1,334,644	1,411,350	.....	29,119	....
December	1,356,962	1,445,528	.....	21,707	....

Among furnaces blown in in February were the new Lackawanna No. 7 at Buffalo, one Thomas Iron Company in the Lehigh Valley, one Edgar Thomson and one Eliza in Allegheny County, Buena Vista in Virginia, Benwood and Top Mill in the Wheeling District, one Columbus in Ohio, one Bay View in Wisconsin and one Dayton in Tennessee, which was afterwards banked and remained so on March 1.

Among furnaces blown out last month were one Colorado, one Buffalo & Susquehanna and Lackawanna No. 1 at Buffalo, Nittany in western Pennsylvania, one Paxton at Harrisburg, Pa., one North Works of the Illinois Steel Company at Chicago, and Spring Valley in Wisconsin.

In the table below is given the active capacity per week on March 1 and February 1, of furnaces producing coke and anthracite iron:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	March 1—Number in blast.	March 1—Capacity per week.	February 1.—Number in blast.	February 1.—Capacity per week.
New York:					
Buffalo	14	13	25,577	13	25,186
Other New York	10	5	5,536	5	5,537
New Jersey	8	8	7,229	8	7,574
Spiegel	2	1	175	1	178
Pennsylvania:					
Lehigh Valley	23	19	12,264	18	12,453
Spiegel	3	3	1,007	3	854
Schuylkill Valley	13	13	13,972	13	14,021
Spiegel	1	1	450	1	560
Low. Susquehanna	8	4	4,959	5	5,473
Spiegel	1	1	675	1	641
Lebanon Valley	10	10	7,618	9	6,789
Spiegel	0	0	0	1	520
Pittsburgh District	43	42	120,260	40	106,822
Spiegel	2	2	1,258	2	1,155
Shenango Valley	20	19	38,719	19	38,801
Western Penn	25	20	27,526	21	28,834
Maryland	4	4	8,367	3	7,504
Spiegel	0	0	0	1	535
Wheeling District	14	13	26,075	11	22,568
Ohio:					
Mahoning Valley	18	16	40,696	17	42,784
Central and Northern and Michigan	21	21	44,975	20	40,439
Hocking Valley and Hanging Rock	12	12	8,397	12	7,509
Illinois	22	20	46,593	22	48,123
Spiegel	2	2	1,561	1	861
Minnesota	1	1	1,180	1	1,248
Wisconsin	5	4	4,055	4	4,119
Missouri	1	1	826	1	525
Colorado	5	4	8,142	5	8,726
The South:					
Virginia	23	15	10,416	14	9,526
Kentucky	7	3	2,126	3	2,257
Alabama	46	28	31,678	28	31,997
Tennessee	18	12	7,854	12	7,336
Georgia and Texas	3	2	869	2	904
Totals	385	319	511,035	317	492,359

The active capacity in coke and anthracite iron fluctuated as follows in the past five years:

	Capacity per week.		Capacity per week.
March 1	511,035	July 1	272,301
February 1	492,359	June 1	336,107
January 1, 1907	507,397	May 1	368,244
December 1, 1906	513,860	April 1	337,257
November 1	500,580	March 1	308,751
October 1	469,665	February 1	273,692
September 1	441,426	January 1, 1904	185,636
August 1	449,908	December 1, 1903	244,156
July 1	460,570	November 1	273,715
June 1	472,622	October 1	353,142
May 1	484,031	September 1	360,197
April 1	484,240	August 1	353,681
March 1	479,737	July 1	384,825
February 1	482,156	June 1	388,178
January 1, 1906	463,673	May 1	373,496
December 1, 1905	475,814	April 1	386,215
November 1	460,449	March 1	347,424
October 1	445,468	February 1	335,239
September 1	412,563	January 1, 1903	346,073
August 1	410,088	December 1, 1902	336,617
July 1	408,617	November 1	330,110
June 1	443,092	October 1	337,837
May 1	452,031	September 1	328,243
April 1	439,564	August 1	328,745
March 1	403,157	July 1	303,793
February 1	405,792	June 1	337,492
January 1, 1905	377,879	May 1	337,627
December 1, 1904	357,846	April 1	331,140
November 1	334,249	March 1	316,039
October 1	319,249	February 1	325,440
September 1	291,573	January 1, 1902	291,992
August 1	246,092		

The Carnegie Steel Company, Pittsburgh, has purchased the patent rights for the manufacture and sale of sheet steel piling heretofore marketed by the Friestedt Interlocking Channel Bar Company, Tribune Building, Chicago. The Carnegie Steel Company is already equipped for the manufacture of these various sections.

NEWS OF THE WORKS.

Iron and Steel.

Cherry Valley Furnace, at Leetonia, Ohio, was blown out on February 22.

One furnace of the Dayton Coal & Iron Company, Dayton, Tenn., was banked on February 23, and the blast was still off at the opening of March.

The Central Iron & Steel Company, Harrisburg, Pa., blew out its No. 1 Paxton Furnace on February 17 for repairs to the bosh.

The blast furnace of the Allegheny Ore & Iron Company, at Buena Vista, Va., was blown in on February 6.

The furnace of the National Tube Company at Benwood, W. Va., was blown in on February 12, after repairs.

The Wheeling Steel & Iron Company, Wheeling, W. Va., blew in its Top Mill Furnace February 26.

No. 1 furnace at the North Works of the Illinois Steel Company, Chicago, Ill., was blown out February 28.

The Spring Valley Iron & Ore Company, Spring Valley, Wis., blew out its furnace on February 20 for relining. It will probably be ready to start up in the latter part of March.

The Soho Furnace of the Jones & Laughlin Steel Company, Pittsburgh, Pa., was blown out for relining and general repairs on March 5 after having made 411,381 tons of low silicon Bessemer and basic iron, chiefly the latter, on its last lining.

The Buffalo & Susquehanna Iron Company, Buffalo, N. Y., had but one stack in blast on March 1, the other having been blown out for repairs on February 8.

The Lackawanna Steel Company blew out its No. 1 furnace at Buffalo on February 26. This furnace had been waiting for the completion of the new No. 7 furnace to go out for needed repairs. No. 3 furnace will be put out for the same purpose later.

The blast furnace of the Nittany Iron Company, Bellefonte, Pa., was blown out on February 25.

Following the fire which recently destroyed the plant of the Fort Worth Iron & Steel Company, Fort Worth, Texas, it was immediately decided to rebuild, and the new plant, which is to be three times the size of the old one, has already been begun. The capacity of the bolt and spike department will be also largely increased.

Furnace D of the Colorado Fuel & Iron Company, Pueblo, Colo., blew out for relining on February 7. Four furnaces of the Minnequa group are now in operation, Furnace F, on which construction work was resumed some time ago, not yet being completed.

The Thomas Furnace Company, Milwaukee, Wis., will build a new blast furnace with a capacity 40 to 50 per cent. above that of the present stack. The equipment now in use will suffice, and the new stack will be built as close as possible to the present one so that the present hoisting house may be used. It will not be necessary to stop the furnace while the new one is under erection. The only material thus far contracted for is the fire brick, which will come from the Niles Fire Brick Company, Niles, Ohio. The new furnace will be in operation about August 1.

The Reading Iron Company's Keystone Furnace at Reading, Pa., which had been in blast about three years and was ready to blow out for repairs, was put out of blast by an explosion, March 6. In the week previous the iron broke out several times without doing any damage, but on March 6 the break out and the explosion following broke all the water connections to the tuyeres and bosh plates, making it impossible to blow out the furnace. The stock was shoveled out and the furnace is now being relined. It is expected it will be in blast by April 15.

General Machinery.

Recent sales of the B. F. Sturtevant Company, Boston, Mass., include: Mechanical draft apparatus, Scranton Railway Company, Scranton, Pa., for 6000 hp. of boilers; Lowell Gaslight Company, Lowell, Mass., 500 hp.; James Register's Sons Company, Baltimore, Md., 125 hp.; Mexican Central Railroad, Tampico, Mexico; Washburn Broe. Company, Glasgow, N. Y.; Burlington Company, Winooski, Vt.; Hitchings Company, New York; Monarch Supply Company, Toronto, Ont. Rotary type high pressure blowers, Union Mfg. Company, New Britain, Conn.; John Russel Cutlery Company, Turners Falls, Mass.; Greer Filter Company, Hamilton, Ohio; Hackensack Water Company, New Milford, N. J.; Riverside Boiler Works, Boston, Mass.; Andrew McLean Company, Passaic, N. J.; Lumley, Dodson Company, Norfolk, Va.; Lawrence Water Company, Massena Springs, N. Y. Generating sets, American Dredging Company, Philadelphia, Pa., two sets; Newport News Shipbuilding & Drydock Company, Newport News, Va., two sets; Hudson Companies, New York, two sets; Pittsfield Street Railway Company, Pittsfield, Mass.; Industrial Works, Bay City, Mich.

The business of George D. Walcott & Son, Jackson, Mich., has been incorporated as the Walcott & Wood Machine Tool Company and will be continued under the same management as heretofore. E. E. Wood is president and general manager; C. L. Walcott, vice-president, and M. C. Walcott, secretary and treasurer.

The Niagara Falls Machine & Foundry Company, Limited, Niagara Falls, Canada, is preparing to move its plant to a new location, where foundry, machine and blacksmith shops will be erected with much larger capacities than the present departments. The location for the new plant has not been definitely decided upon. The company has lately received a number of large contracts and is in need of much larger facilities to take care of its business.

The Charles A. Strelinger Company, Detroit, Mich., dealer in machinery and tools, has increased its capital stock from $100,000 to $150,000.

The New York Blower Company, Bucyrus, Ohio, will rebuild the part of its plant which was recently destroyed by fire, but will not require any additional machinery at the present time, as the equipment was not damaged beyond repair.

The Pilling Air Engine Compaany, Detroit, Mich., is getting out plans and specifications for a new factory building which will more than double the present capacity, and has purchased 2 acres of land, sufficient to expand along other lines identified with hoisting machinery and railroad equipment. J. C. Fleming is president and manager. The company has just furnished complete equipment for the American Car & Foundry Company's steel car plants at Madison, Ill., to replace electric racking and trolley hoists, and St. Louis, Mo. This company is now using in all its plants Pilling hoists and trolley racking devices over pit riveters.

The C. B. Ford Company, Richmond, Va., is building hot water heaters for the Coppridge Heater Corporation, Richmond, which it is delivering at the rate of 30 heaters per month. It is building four automatic machines for loading and trimming coal vessels, and in addition to orders for special machinery for a variety of purposes it has a contract for the building of the Shelton Ajax water turbine.

The Loew Mfg. Company, Cleveland, Ohio, has designed and will soon put on the market a new power pipe machine. The machine is intended for use by small steam fitters and others who do not wish to go to the expense of buying the larger machines.

The Richmond Forging Corporation, Richmond, Va., has increased its capital stock from $100,000 to $200,000, to enable it to make improvements. It has added a 1000-lb. drop hammer and a large cold sawing machine, the latter being made necessary by the increase of business in heavy forging work.

The Clyde Iron Works, Duluth, Minn., founder and machinist, is preparing plans for the building of a new plant, which will consist of eight buildings. Plans are now about ready to be submitted to contractors.

The Schaake Machine Works Company, New Westminster, B. C., is erecting new shops, 66 ft. deep, with total frontage of 462 ft. on Front street, including foundry, machine shop and blacksmith department. The buildings will be equipped with modern machinery operated by electricity, and will be served by a 6-ton electric traveling crane with a 30-ft. span. A spur from the Canadian Pacific Railroad will run into the buildings, affording excellent shipping facilities.

Power Plant Equipment.

The Birmingham Iron Foundry, Derby, Conn., has built under specifications of the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., what is believed to be one of the largest if not the largest accumulator ever constructed. It will be used in connection with the hydraulic power system of a large tubing works. The total hight of the accumulator is 57½ ft., and it carries a dead weight of 303,000 lb. and a total weight of 440,000 lb. The ram is 22 in. in diameter, with 24-in. stroke. It is designed for a pressure of 1000 lb. The capacity is 475 gal. It is fitted with a buffer safety valve, designed to protect the foundation if the pipe line should break and drop the whole weight. It was necessary to assemble the accumulator on its side.

The Swift Fuel & Appliance Company has incorporated with a capital stock of $1,000,000 to put on the market fuel feeders and steam motors, which will be manufactured under contract for the present. The company has an office in the Great Northern Building, Chicago, Ill.

The Shelton Water Wheel & Machine Company, Richmond, Va., is about to be incorporated with a capital of $150,000 for the manufacture of a new patent turbine wheel invented by James L. Shelton. The wheel is said to be a radical departure from all other water wheels, both in its gates, or method of applying the water, and in the revolving part of the wheel proper. One of the wheels is about to be tested at the Holyoke, Mass., testing flume.

The Portland Railway Light & Power Company, Portland, Ore., is to erect another power plant on the Upper Clackamas River, 2½ miles above its Cazadero power plant. Plans have been prepared for the plant, which will have a capacity of 25,000 hp. and will cost about $750,000. F. G. Sykes is general manager.

The Webster Citizens' Company, Buffalo, N. Y., has been incorporated, with a capital of $600,000, and will build a large factory, with storehouses, for the manufacture of artificial ice. The ice plant will have a capacity of 40,000 tons per year.

Foundries.

The Trahern Pump Company, Rockford, Ill., manufacturer of iron and brass pumps, has let contract for the building of an addition to its foundry, 72 x 96 ft. A new cupola and necessary tools for the equipment of the addition have already been ordered.

The J. A. & P. E. Dutcher Company, Milwaukee, Wis., iron founder, has amended its articles of incorporation by changing its name to the Dutcher Company and increasing the number of its directors from three to five.

The Orange Iron Works, Orange, Texas, has enlarged its foundry department, put in new cupola and installed a new engine. Additional machinery, including a 24-in. swing lathe, has been added to the machine shop department.

The recent fire at the plant of the Casey & Hedges Company, Chattanooga, Tenn., only destroyed the old machine shop, which will not be rebuilt, as the company has just completed a new shop which will be ready for operation within the next 10 days.

The Lunenburg Foundry Company, Limited, is being organized at Lunenburg, N. S., with a capital stock of $50,000, to manufacture stoves and ranges, hot water boilers, hot air furnaces and to do general foundry work. The company will install a machine shop in connection with its foundry, putting in new machines and a new line of patterns. It expects to have its plant in operation by June 1. J. C. Rockwell is interested.

Bridges and Buildings.

The Newton Engineering Company, Milwaukee, Wis., contracting engineer, has increased its capital stock from $10,000 to $50,000. The increase is made for the purpose of extending its contracting business and carrying out present large contracts. The company makes a specialty of the erection of cement structures, both buildings and bridges.

The Meredith Construction Company has been incorporated at Terre Haute, Ind., with $20,000 capital stock, to build steel bridges, structures and subways, viaducts, &c. The directors are Fred C. and Paul J. Meredith and Lawrence M. Stoff.

The American Bridge Company has purchased nearly all the machinery and other equipment it will require for the improvements to be made at its plant at Elmira, N. Y., where about $1,000,000 is to be expended.

Fires.

The factory of the Ross Mfg. Company, manufacturer of woodworking machinery, Niagara street, Buffalo, was badly damaged by fire on the night of March 6. The total loss amounted to $35,000, including damage to machinery and stock of the Kingory Mfg. Company, Robertson Mfg. Company, Frontier Gas Meter & Appliance Company and the Thomas Auto-Bi Works.

A fire on March 9 did $10,000 damage to the new locomotive repair shop of the New York, New Haven & Hartford Railroad, at Readville, Mass.

The machine shop of C. C. Hornsby, Krum, Texas, was destroyed by fire March 5. The loss is placed at $500,000.

The machine shop of the J. J. McLaughlin Company, Toronto, Ont., was burned March 7, the loss being about $10,000.

The building occupied by the Kast Copper & Sheet Iron Company and Fries & Co., brass founders, Buffalo, N. Y., was burned March 3, the loss being about $900,000.

The plants of the Combahee Fertilizer Company, McMurphy & Co., the Charleston Iron Works, and the South Pick Company, Charleston, S. C., were burned March 9, the loss being about $50,000.

Hardware.

The Acme Wire Fence Company, Detroit, Mich., was recently incorporated with a capital stock of $1000.

The National Cable & Mfg. Company, Niles, Mich., has been incorporated with a capital stock of $40,000, of which $30,000 has been subscribed and $20,000 paid in, to manufacture copper cable lightning rods. It is the purpose of the company to distribute its product through the hardware and other legitimate trade channels.

Under a reorganization, the name of the Western Hay Tool Company, Ottumwa, Iowa, has been changed to La Crosse Hay Tool Company, and the following officers elected: A. Hirsheimer, president; B. F. Harber, vice-president; F. R. Davis, treasurer; O. S. Hitchner, secretary. For the present season at least the plant will remain in Ottumwa, but its final removal to La Crosse, Wis., is under consideration.

The Globe Mfg. Company, Perry, Iowa, has been newly organized for the manufacture of washing machines, with a capital stock of $20,000. Machinery for the plant's equipment has been bought and will be ready for operation within a short time.

The Waterbury Clock Company, Waterbury, Conn., is to raise one of its buildings one story, giving additional manufacturing space 40 x 250 ft.

The business of the Kirby Mfg. Company, Middletown, Conn., manufacturer of toys and novelties, formerly conducted as a copartnership, has been incorporated with capital stock of $15,000. Samuel Kirby, Joseph Merriam and E. A. Foster are the incorporators.

The Oakville Company, Waterbury, Conn., manufacturer of pins, &c., is to extend its plant by the erection of a new brick building 45 x 200 ft. and either four or five stories.

The Colonial Brass Company has been organized at New Haven, Conn., to manufacture fireplace fixtures, candlesticks and other metal goods at 440 Elm street. A. C. Stowe is secretary of the corporation. The company states that it is not at present in the market for equipment.

The Smith Improved Lock Nut Company, Rockford, Ill., besides having just completed a two-story addition, doubling the floor space of its main plant, is preparing plans for a new factory, to be three times the size of the present plant. In addition to the manufacture of lock nuts the present plant is now equipped for the manufacture of common bolts and nuts and track bolts.

The Alton Mfg. Company, manufacturer of illuminating fixtures, is to operate the plant of the Sandwich Glass Company, Sandwich, Mass., which has been idle for some time. It is proposed to begin business on a somewhat large scale, and to employ a large force of glass and metal workers. C. F. King, 262 Washington street, Boston, is at the head of the undertaking. The Sandwich Glass Company's plant consists of large buildings, with plenty of land for purposes of enlargement, and a ship canal to the bay, which furnishes tidewater facilities for shipping and receiving goods and materials. The new Cape Cod Canal will add to the convenience of the works.

The Syracuse Chilled Plow Company, Syracuse, N. Y., has purchased the Whitman & Barnes Mfg. Company's plant in that city. While the company has sufficient room for manufacturing purposes at present, on account of the space occupied for storing goods which are made up in advance it has been considerably crowded for the past year or two for storage space. The Whitman & Barnes plant occupies the block adjacent to the two blocks already owned by the company and is therefore conveniently located. For the present the company will use the new buildings for storage purposes only, but later on will undoubtedly do part of its manufacturing there. Some years ago when the concern started manufacturing wheelbarrows, trucks, scrapers, pushcarts, &c., it was with the idea of having a filler to keep busy during the dull season when plows were not in such demand. The business has increased so rapidly on this line, we are advised, that it now makes up a large part of the company's sales. The company also has recently completed the purchase of the plow business of the Standard Harrow Company, Utica, N. Y., and the Alexander Davidson Foundry at Canandaigua, N. Y., which used to be the Robinson Chilled Plow Company. These two purchases will materially help in taking care of the present large demand for goods in the company's line.

The Hill Tool Company and the Standard Mfg. Company, Anderson, Ind., have been succeeded by the Hill Standard Mfg. Company, which has been incorporated with $120,000 capital stock. Hugh Hill is president and James M. Starr secretary. The company will manufacture the "Irish Mail" and other wagons for children, as well as a line of tools. In the reorganization the capital stock was increased from $24,000.

The Ohio Nut & Bolt Company, Berea, Ohio, has plans about completed, and will soon begin the erection of an addition, 60 x 180 ft., to its present factory. This will be used entirely for the manufacture of bicycle and automobile chains, removing all chain machinery from the present building, thus giving the company more room to take care of its constantly increasing business in the bolt line. Business is very good, the plant running 13 hours per day at present, and beginning a double shift next week. The chain business was taken on about six months ago as a side line but is developing into an important part of the company's product.

The Huber Account Register Company, Buffalo, N. Y., manufacturer of account filing devices and registers, has purchased a site at Main street and the Erie Railroad and will erect a three-story brick factory building, 30 x 140 ft. The new plant will be equipped with special machinery required in the manufacture of the company's patented filing devices, which are made of wood, steel and aluminum.

Miscellaneous.

A new industry has been secured for Eau Claire, Wis., for the manufacture of plows. Arrangements have been made through the Northwestern Steel & Iron Works of that city. The company will be called the Chippewa Chilled Plow Works, and the machinery for manufacturing the plows is being removed from Elmira, N. Y., to Eau Claire. For the present machinery will be installed in the available space in the plant of the Northwestern Steel & Iron Works to take care of orders now on hand, but in the spring it is planned to erect a new plant, drawings for which are now being made. The plant will consist of a main building, 50 x 200 ft., two stories in hight.

The chemical plant of the Ashland Iron & Steel Company, Ashland, Wis., recently suffered a small loss by fire, which was, however, not so great as currently reported, the damage amount-

ing to about $3000. Repairs have already been made and the plant is again in operation.

The Harris Palatial Car Company, New York, has purchased a controlling interest in the T. H. Buckley Car Mfg. Company, Worcester, Mass., and will manufacture steel underframing cars, as well as continuing the present line of electric cars and lunch carts. There will be no change in the management of the business.

The Vanderbeek Tool Works, Hartford, Conn., manufacturer of universal joints, &c., has moved from the building of the Hartford Machine Screw Company, where it has been located for some years, to the Hartford Bedstead Company's building, on the same avenue. The Hartford Machine Screw Company requires the space for its own purposes, necessitating the removal of the tenant.

The R. L. Barnes Safe & Lock Company, Richmond, Va., which has been handling safes and vaults for 20 years, has recently started a modern plant for the manufacture of high grade safes. The president is R. L. Barnes; secretary and treasurer, J. L. Hopkins, and superintendent, Geo. J. H. Goebler.

The Fellwock Automobile & Mfg. Company has been incorporated at Evansville, Ind., with $20,000 capital stock, to make automobile parts. The directors are P. B., W. E. and J. F. Fellwock.

Rhodes, Curry & Co., car builders, Amherst, N. S., will build an addition to their planing mill so as to be able to handle about five more cars a day. A number of new machines will be installed, including a heavy planer, cutting-off saw, &c. The company has declared a dividend of 6 per cent, payable April 1.

The Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., announces the completion of its new coil department buildings to take the place of those destroyed in the recent fire. After a loss of only about 16 working days the company has resumed the bending of coils on just as large a scale as before the fire, and it expects to operate this department night and day until it has caught up with all orders it has on hand. These present buildings will be replaced by a new steel structure covering an acre of ground, which will be built without interfering with present operations and which is expected to be completed this summer.

G. A. Doeright has purchased the entire interest of John Tod, Richard Garlick and W. W. Bonnell in the Falcon Bronze Company, Youngstown, Ohio. The company has been reorganized and has elected the following directors: G. A. Doeright, J. G. Haney, Thomas Parrock, E. E. Miller, C. H. Kennedy and R. H. Doeright. The board organized by electing G. A. Doeright, president and general manager; Thomas Parrock, vice-president; J. G. Haney, secretary; E. E. Miller, treasurer, and R. H. Doeright, superintendent.

After a most thorough and critical test the Pittsburgh Automatic Vise & Tool Company, Pittsburgh, Pa., was allotted the contract for the vise equipment for one of the large new plants being built by Dodge & Day, engineers, Philadelphia. This is but one of the many contracts which the company has secured for complete equipment of shops.

Good progress is being made on the new plant being erected by the Petroleum Iron Works Company at Petroleum, near Sharon, Pa. About 600 tons of steel will be used in the erection of the buildings, about 450 tons of which are in place, and the balance will be erected in a short time. The large boiler house is almost finished, and the new office building, to cost about $25,000, is ready for the roof. It is expected to have this plant finished within two months, unless there is delay in receiving the structural steel. The Petroleum Iron Works Company now operates a plant at Washington, Pa., its product being heavy steel plate construction of all kinds, and this will also be the output of the new plant. As soon as the new plant is completed the works at Washington will be abandoned.

The Arthur Koppel Company, Machesney Building, Pittsburgh, expects to have its new plant at Koppel, Beaver County, Pa., now in course of construction, ready for operation within the next few days. The main buildings, which were erected under the supervision of Dodge & Day, consulting engineers, Philadelphia, include erecting shop, car shop, switch shop, machine shop, blacksmith shop and power plant. Concrete and steel construction is used throughout. The plant will manufacture rails, portable tracks, switches and frogs, turntables, contractors' locomotives, steel and wooden cars, platform and charging cars.

The Alpena Portland Cement Company, Alpena, Mich., has not yet ascertained what machinery will have to be replaced in its plant, which was recently damaged by fire. The power plant was not injured.

The Park Steel Company, Pittsburgh, of which practically all the stock is owned by the Crucible Steel Company of America, is being liquidated. In securing control of the company the Crucible Steel Company was originally unable to buy all the stock and made a standing offer of par. All but a few shares have now been secured.

The Continental Car & Equipment Company.

The Continental Car & Equipment Company, Highland Park, Louisville, Ky., has within the past four months secured 14½ acres of ground, upon which initial buildings, providing over 30,000 ft. of floor space, have been erected and the necessary machinery installed, including traveling cranes, trackage and turntables. The motive power is electricity throughout. Additional buildings will be placed under construction at once, as the present plant is inadequate to meet the demand for the company's product, which consists mainly of dump cars. These are adapted to the use of railroads, sand pits, brick yards, phosphate pits and of contractors engaged in the removal of great quantities of earth, rock, sand, gravel, &c. Specially designed cars are built for sugar cane plantations and sugar factories. The present capacity is equivalent to an output of 5000 to 6000 cars per annum. All are manufactured under late patents. One of the latest cars made is stated to be the largest dump car on four wheels, and has been built for handling the sediment and drainage of the boiling kettles in a large sugar factory in Porto Rico. The company is shipping dump cars to the Philippine Islands, Cuba, Central and South America, as well as throughout the United States. Some 10 different styles of dump cars, including seven stock sizes, are built in addition to flat, ballast, gondola and logging cars, but the company is prepared to construct any style of small car desired. The location of the plant is one that provides for most advantageously securing the highest grade of oak lumber and other materials required, being chosen for that reason. This makes it unnecessary to economize on the quality or quantity of the structural materials used in order to meet competition.

The National Metal Trades Convention.

The annual convention of the National Metal Trades' Association will be held in Boston, Mass., on March 21 and 22. The place of meeting will be the Hotel Brunswick, where many of the delegates will be quartered. The Boston Branch has made preparations to entertain the visitors, the plans including a complimentary banquet on the evening of the 21st. There is promise of a very large attendance, due in part to increasing general interest and also to the fact that the membership of the national body has nearly doubled during the past year.

The Mechanical Engineers.—J. W. Lieb, Jr., vice-president of the American Society of Mechanical Engineers, will deliver a lecture March 21 before the society in the auditorium of the Engineering Building, 29 West Thirty-ninth street, New York, on "Vesuvius and Pompeii." It will be illustrated by lantern slides from photographs taken by F. A. Perret, who was at the Vesuvius Observatory during the last eruption, and from photographs taken by Mr. Lieb during a visit after the eruption, and with lantern slides showing the state of the mechanical arts at Pompeii. Through the courtesy of E. E. Burton Holmes, original moving pictures of Vesuvius in eruption and of flowing streams of lava, taken by Oscar B. Depue, will be shown.

The Gould Coupler Company, Depew, N. Y., has just installed and started the fourth 20-ton open hearth furnace in its steel plant and is installing the following new equipment in the recently completed addition to the machine shop: One 26-in. Cincinnati double head traverse shaper, with 12-ft. bed; one 20-in. Niles-Bement-Pond shaper; one two-phase No. 23 foundry cold saw, made by the Birdsboro Steel Foundry & Machine Company; one American file sharpening machine, and two 3-ton, two-motor, cage-controlled traveling electric hoists for telpherage system, made by Pawling & Harnischfeger, Milwaukee.

The Independent Steel & Wire Company, House Building, Pittsburgh, has arranged to market the output of the International Steel & Wire Company of Hoboken, Allegheny County, Pa., manufacturer of shafting, drill rods and special shapes.

The Iron and Metal Trades

The monthly Pig Iron statistics collected by *The Iron Age* show that the output for February, a short month, of Coke and Anthracite Pig Iron amounted to 2,045,068 tons, as compared with 2,205,607 gross tons in January. This is an increase in the daily rate of production from 71,148 tons in January to 73,028 tons in February, an increase of 1880 tons daily. Of this, however, 1700 tons daily is due to the larger output of the Steel works furnaces, which made 1,317,923 tons in February, as compared with 1,406,397 tons in January. This shows that the output of the merchant furnaces which supply the open market has not yet been materially increased.

Strenuous efforts are being made to get out tonnage, now that weather conditions are improving. The indications, from the achievements thus far this month, are that the March output of Pig Iron and of finished products of the Steel Corporation will exceed the banner record of October last. Possibly a record tonnage may also be attained in Steel.

In Pig Iron both sides maintain a defensive attitude, and there is comparatively little business doing for delivery during the second quarter. Some interests in the Birmingham District do report some round sales, but others have done very little. There continues to be some offering of foreign Foundry Iron at prices considerably below the domestic prices for like deliveries. One of the large electric companies is in the market for 10,700 tons of Foundry Iron, but otherwise the demand is not large.

For early delivery Bessemer Pig is as tight as it well could be in the Central West, and considerable tonnage could be marketed if it were at all available. In the East the Steel works seem to be getting their deliveries in better shape. An isolated lot of Basic for the second quarter has been offered at $24 delivered, and negotiations are said to be practically concluded for a few thousand tons of Foreign Basic at about the same price.

The largest Rail order placed during the week was for 21,500 tons for the Kansas City, Mexico & Orient. American Rail mills are much interested in the large prospective demand this year for South America and Japan, a large share of which will come to them.

No particularly large orders for Structural Material have been taken this week. Among those placed are 5000 tons of bridge work for the New Haven road and 2300 tons for two buildings in San Francisco.

The Pipe and Tube trade is in an exceptional position. The National Tube Company has been forced to withdraw prices, and has notified the trade that no more orders will be booked for shipment prior to June 1, prices to be fixed at the time of shipment of the order. Outside mills have withdrawn their prices and are quoting an advance of $2 to $4 per ton.

The Sheet and Tin Plate mills are running under tremendous pressure. There is some talk of advances in prices, but it is well understood that the leading interest is opposed to any such action.

The Implement makers and the mills rolling Bars and Merchant Shapes are still negotiating over the fixing of prices on season contracts. Last year the mills made concessions, but they show little disposition to do so this year.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Mar.13, 1907.	Mar.6, 1907.	Feb.13, 1907.	Mar.14, 1906.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	*$25.25*	$25.25	$26.00	$17.00
Foundry No. 2, Southern, Cincinnati	26.00	26.00	26.00	16.25
Foundry No. 2, Local, Chicago	25.50	25.50	25.50	17.50
Bessemer, Pittsburgh	22.85	22.85	22.85	16.35
Gray Forge, Pittsburgh	*21.85*	21.85	22.25	16.00
Lake Superior Charcoal, Chicago	27.00	27.00	27.00	18.50
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	*29.00*	29.00	29.50	24.00
Forging Billets, Pittsburgh	36.00	36.00	36.00	26.00
Open Hearth Billets, Phila	33.00	33.00	33.00	28.00
Wire Rods, Pittsburgh	37.00	37.00	37.00	33.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	18.00	18.00	18.00	14.50
Steel Rails, Melting, Phila	**19.25**	19.50	18.75	18.00
Iron Rails, Chicago	25.00	25.00	25.00	20.00
Iron Rails, Philadelphia	*27.00*	27.00	27.50	24.50
Car Wheels, Chicago	**24.00**	23.50	23.50	15.75
Car Wheels, Philadelphia	**23.25**	23.25	23.00	17.00
Heavy Steel Scrap, Pittsburgh	18.00	18.00	18.00	16.00
Heavy Steel Scrap, Chicago	16.00	16.00	16.00	14.50
Heavy Steel Scrap, Philadelphia	**19.00**	19.00	18.50	15.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.93½	1.93½	1.93½	1.75
Common Iron Bars, Chicago	1.81½	1.81½	1.81½	1.60
Common Iron Bars, Pittsburgh	1.80	1.80	1.80	1.65
Steel Bars, Tidewater, New York	1.74½	1.74½	1.74½	1.64½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Beams, Pittsburgh	1.70	1.70	1.70	1.60
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Angles, Pittsburgh	1.70	1.70	1.70	1.60
Skelp, Grooved Steel, Pittsburgh	**1.90**	1.90	1.85	1.65
Skelp, Sheared Steel, Pittsburgh	**2.00**	2.00	1.95	1.70
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.20
Wire Nails, Pittsburgh	2.00	2.00	2.00	1.80
Cut Nails, Pittsburgh	2.05	2.05	2.05	1.80
Barb Wire, Galv., Pittsburgh	2.45	2.45	2.45	2.25
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	**25.50**	25.25	*25.12½*	15.25
Spelter, New York	*6.95*	6.95	7.00	6.15
Spelter, St. Louis	6.80	6.80	6.80	6.05
Lead, New York	**6.35**	6.35	6.30	4.45
Lead, St. Louis	6.10	6.10	6.10	4.37½
Tin, New York	*42.25*	41.90	42.40	29.37½
Antimony, Hallett, New York	*23.50*	23.50	25.00	7.87½
Nickel, New York	45.00	45.00	45.00	40.00
Tin Plate, 100 lb., New York	$4.09	$4.09	$4.09	$3.74

Chicago.

FISHER BUILDING, March 13, 1907.—(*By Telegraph.*)

Without impulsive force strong enough to move it progressively in either direction, the Pig Iron market seems becalmed and transactions are mainly confined to spot and nearby deliveries. The position of those furnaces that are holding far above market prices on second half requirements is apparently unchanged, but in the meantime $18, Birmingham, for No. 2 Foundry has become the recognized quotation for that period. If the estimates made of tonnage required for consumption during the last half of the year are anywhere near correct, and the unsold furnace schedules are fairly gauged, sellers have strong grounds upon which to base their hopes of continued high prices. On the other hand, in a market crisis of this kind, unity of action among selling interests is of the utmost importance in the maintenance of price schedules, and in the present instance it is by no means assured. It is evident that the present stationary market conditions cannot be long continued, but the basis of future operations has not yet been determined. The heavy demand noted for Cast Scrap is doubtless occasioned by its freer use as a mixer by melters who are thus husbanding their supply of Pig Iron. There is but little change of note in any of the finished products, and no dearth of orders is apparent in any department. Structural mills are well supplied with specifications, and though the leading mills are still congested with Plate orders, reasonably prompt deliveries are being made from some independent mills.

Pig Iron.—No interest is manifested by consumers in last half purchases and the trade that is moving is pretty closely confined to present or nearby requirements. The total volume of such business is not large and is in the hands of a comparatively few sellers, since a number of leading fur-

nace interests are closely sold up for the entire first half. A sharp difference is now made between transit March and April shipments, $23 being the Birmingham price for No. 2 Foundry Iron in actual transit, $22 for shipment during the present month, and $21.50 for second quarter. Quotations on Northern Irons are still firmly maintained. But little, if any, improvement is noted in the movement of freight from Southern points. No inquiries have been reported in the market of a character that would indicate the beginning of an early buying movement. The following quotations are for March and April shipments, including the 25c. advance in freight rate on Southern Irons, effective April 1:

Lake Superior Charcoal	$27.00 to $27.50
Northern Coke Foundry, No. 1	26.00 to 26.50
Northern Coke Foundry, No. 2	25.50 to 26.00
Northern Coke Foundry, No. 3	25.00 to 25.50
Northern Scotch, No. 1	26.00 to 27.00
Ohio Strong Softeners, No. 1	26.00 to 26.50
Ohio Strong Softeners, No. 2	25.50 to 26.00
Southern Coke, No. 1	26.85 to 27.35
Southern Coke, No. 2	26.35 to 26.85
Southern Coke, No. 3	25.85 to 26.35
Southern Coke, No. 4	25.35 to 25.85
Southern Coke, No. 1 Soft	27.35 to 27.85
Southern Coke, No. 2 Soft	26.85 to 27.35
Southern Gray Forge	22.35 to 22.85
Southern Mottled	22.35 to 22.85
Malleable Bessemer	26.00 to 26.50
Standard Bessemer	25.30 to 25.80
Jackson Co. and Kentucky Silvery, 6 %	30.30 to 30.80
Jackson Co. and Kentucky Silvery, 8 %	32.30 to 32.80
Jackson Co. and Kentucky Silvery, 10 %	34.30 to 34.80

Metals.—The usual amount of inquiries and orders is being received and no change of importance in demand or prices is noted. Copper still maintains its market position and Spelter is in strong demand. We quote as follows: Casting Copper, 26¾c. to 27¼c.; Lake, 27c. to 27½c., in car lots for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 44½c.; small lots, 45c.; Lead, Desilverized, 6.50c. to 6.60c., for 50-ton lots; Corroding, 7.25c. to 7.35c. for 50-ton lots; on car lots, 2¼c. per 100 lb. higher; Spelter, 7c.; Cookson's Antimony, 28½c., and other grades, 26½c. to 27½c.; Sheet Zinc is $8.50 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 21½c.; Heavy Copper, 20¼c.; Copper Bottoms, 19½c.; Copper Clips, 20c.; Red Brass, 19½c.; Red Brass Borings, 16¼c.; Yellow Brass, 16c.; Yellow Brass Borings, 14¼c.; Light Brass, 13c.; Lead Pipe, 5.50c.; Tea Lead, 5c.; Zinc, 5c.; Pewter, No. 1, 1.28c.; Tin Foil, 34c.; Block Tin Pipe, 27½c.

(By Mail.)

Billets and Rods.—Lack of movement, due to scarcity of Rods, is responsible for the continuance of inactivity that has for weeks characterized the market. Such small lots as are being sold continue to command from $36 to $37. No sales of importance of Forging Billets are reported, and prices are still held at $38 and upward, according to size.

Rails and Track Supplies.—No special activity, either in inquiries or present sales is apparent, but Western mills have at least enough orders on hand to keep them busy for several weeks ahead. There is a fair amount of business developing from day to day in the general line of Track Supplies. A recent inquiry for 15,000 tons of Standard Section Rails for prompt delivery has not yet resulted in the placing of an order. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.90c. to 1.95c.; Spikes, 2.40c. to 2.50c., according to delivery; Track Bolts, 2.75c. to 2.85c., base, Square Nuts, and 2.90c. to 3c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, $35; 25-lb., $36; 20-lb., $37; 16-lb., $38; 12-lb., $39, f.o.b. mill. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—Specifications in sufficient volume to fill rolling schedules comfortably and absorb the available Steel supply are being furnished. A large amount of new business is developing in building structures, but the most important tonnages have not yet reached the contract stage. Contracts have been placed for the Structural Material for two new buildings in San Francisco, the Spreckels Building, 2000 tons, and foundation material for the Phelan Building, 1000 tons. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.96½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—But little improvement in deliveries is noticed, though it is believed that instead of falling further behind the present congested condition will slowly be overcome. Meantime the resultant demand on store stocks is making it difficult for jobbers to maintain them in unbroken assortment. We quote for future deliveries as follows: Tank Plate, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.86½c. to 2.06½c.; 3-16 in., 1.96½c. to 2.16½c.; Nos. 7 and 8 gauge, 2.01½c. to 2.21½c.; No. 9, 2.11½c. to 2.31½c.; Flange quality, in widths up to 100 in., 1.96½c. to 2.06½c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.96½c. to 2.16½c.; Flange quality, 2.06½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in., up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.55c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—No commodity in the line of finished products shows a more persistent demand than is observed in Sheets. Deliveries in general are far behind on all classes of Sheets. Galvanized Sheets show no improvement in this respect, and are, if anything, scarcer and longer delayed than heretofore. No. 28, which since the last advance, has been quoted from store at 4.10c., is now firm at 4.15c., and the outside spread of store prices on both Black and Galvanized is now being realized on stock shipments. We quote as follows: Blue Annealed, No. 10, 2.01½c.; No. 12, 2.06½c.; No. 14, 2.11½c.; No. 16, 2.21½c.; Box Annealed, Nos. 17 to 21, 2.51½c.; Nos. 22 to 24, 2.56½c.; Nos. 25 and 26, 2.61½c.; No. 27, 2.66½c.; No. 28, 2.76½c.; No. 29, 2.86½c.; No. 30, 2.96½c.; Galvanized Sheets, Nos. 10 to 14, 2.81½c.; Nos. 15 and 16, 3.01½c.; Nos. 17 to 21, 3.16½c.; Nos. 22 to 24, 3.31½c.; Nos. 25 and 26, 3.51½c.; No. 27, 3.71½c.; No. 28, 3.91½c.; No. 30, 4.41½c.; Sheets from store: Blue Annealed, No. 12, 2.30c.; No. 14, 2.35c.; No. 16, 2.45c.; Box Annealed, Nos. 18 to 21, 2.70c.; Nos. 22 to 24, 2.75c.; No. 26, 2.80c.; No. 27, 2.85c.; No. 28, 2.95c.; No. 30, 3.35c.; Galvanized from store: Nos. 10 to 20, 3.30c. to 3.35c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

Bars.—As suggested in last week's report, a price agreement on requirements of the agricultural implement manufacturers will soon be up for adjustment. Whether or not a concession of $2 a ton will be made, as was the case last year, is a subject of present speculation; but in view of the strong position occupied by the mills, as a result of this year's unusual demand, there is a disposition to refuse any concession from ruling market prices. Definite action, however, is not likely to be taken for several weeks. So far as can be ascertained, prices are maintained, though rumors are heard of a slight shading on Bar Iron. Quotations are as follows: Iron Bars, 1.81½c. to 1.86½c.; Steel Bars, 1.76½c., both half extras; Hoops, 2.16½c., extras as per Hoop card; Bands, 1.76½c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.86½c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras: Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—While no definite change is reported in mill conditions as to deliveries, progress in the execution of belated orders is nevertheless being made, and it is hoped that the near future will show marked improvement in the clearance of back orders. Discounts on car lots, Chicago, are as follows: Black Steel Pipe, 74.35 on the base sizes, ¾ to 5 in., and Galvanized, 64.35. From store in small lots, Chicago jobbers now quote 72½ per cent. on Black Steel Pipe, ¾ to 6 in. Iron Pipe is held in advance from four to five points above these prices.

Boiler Tubes.—The demand for Boiler Tubes is well sustained, and slower shipments are the rule from all sources of supply. Store demand is very active and is being promptly supplied from well filled stocks. Mill quotations are as follows, on the base sizes: 2¾ to 5 in., in carload lots, Steel Tubes, 63.35; Iron, 50.35; Seamless, 49.35; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	35	35	35
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	35
2¾ to 5 in.	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—No abatement in the supply of orders that is furnishing a full quota of business for the mills is reported in any quarter. Trade is of a general character and without notable feature. Prices are unchanged, and are as follows: Planished or Smooth Finished Tire Steel, 1.96½c.; Iron Finish, up to 1½ x ½ in., 1.91½c.; Iron Finish, 1½ x ½ in. and larger, 1.76½c., base; Channels for solid rubber Tires, ¾ to 1 in., 2.26½c., and 1⅛-in. and larger, 2.16½c.; Smooth Finished Machinery Steel, 2.16½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 2.06½c.; Cutter Shoe, 2.35c.; Toe Calk Steel, 2.31½c.; Railroad Spring, 1.96½c.; Crucible Tool Steel, 6½c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, base territory.

Cast Iron Pipe.—Detroit is in the market for 6000 tons. The aggregate tonnage of straggling orders is small. We quote as follows: Water Pipe, 4-in., $38 to $39; 6 to 12 in., $37 to $38; 16-in. and up, $36 to $37, with $1 extra for Gas Pipe.

Coke.—Very little business is reported and trade is confined to small lots for current needs. We quote 72-hr. Connellsville Coke at $3.75 to $3.90 per car lot at the oven; Stonega 72-hr. Foundry Coke, $6.75, Chicago; By-Product, $7.15, f.o.b. Chicago, prompt delivery.

Old Material.—Weakness rules in all lines of Wrought Scrap, for which there seems to be but little demand from any source. Nor are there any predictions of better prices or demand to prevail in the near future. Cast Iron grades of all kinds suitable for melt mixers are in strong demand, though prices have advanced to a point that will curtail its use by founders. As an indication of its prohibitive effect, it is noted that an urgent inquiry for 100 tons of No. 1 Cast, meeting no better offer than $20, refused to buy. Old Car Wheels show better strength and quotations are advanced 50c. a ton. Railroad offerings this week comprise the following lists: Baltimore & Ohio, 6000 tons; Chicago, Rock Island & Pacific, 1100 tons; Chicago & Eastern Illinois, 900 tons. The following quotations are on gross tons, f.o.b. Chicago:

Old Iron Rails	$25.00 to $26.00
Old Steel Rails, 3 ft. and over	19.00 to 19.50
Old Steel Rails, less than 3 ft.	18.00 to 18.50
Relaying Rails, standard sections, subject to inspection	31.00 to 32.00
Old Car Wheels	24.00 to 24.50
Heavy Melting Steel Scrap	16.00 to 16.50
Frogs, Switches and Guards	16.50 to 17.50
Mixed Steel	12.50 to 13.00

The following quotations are per net ton:

Iron Fish Plates	$20.00 to $21.00
Iron Car Axles	26.50 to 27.00
Steel Car Axles	21.50 to 22.00
No. 1 Railroad Wrought	15.25 to 15.75
No. 2 Railroad Wrought	14.25 to 14.75
Railway Springs	15.50 to 16.00
Locomotive Tires, smooth	16.50 to 17.00
No. 1 Dealers' Forge	12.00 to 12.50
Mixed Busheling	11.00 to 11.50
Iron Axle Turnings	11.50 to 12.00
Soft Steel Axle Turnings	11.50 to 12.00
Machine Shop Turnings	11.50 to 12.00
Cast Borings	9.25 to 9.75
Mixed Borings, &c	9.00 to 9.50
No. 1 Mill	10.00 to 10.50
No. 2 Mill	9.00 to 9.50
No. 1 Rollers, cut to Sheets and Rings	11.50 to 12.00
No. 1 Cast Scrap	20.00 to 21.00
Stove Plate and Light Cast Scrap	15.00 to 15.50
Railroad Malleable	16.00 to 16.50
Agricultural Malleable	15.00 to 16.00

Philadelphia.

PHILADELPHIA, PA., March 12, 1907.

The Iron and Steel markets remain in much the same condition as they have been during the past several weeks. Prices are firm, and for anything that can be delivered within the next 60 to 90 days there is a very urgent demand. Furnaces are so far behind with their deliveries, however, that there is but little material that can be made available, but whenever a carload or two, or lots of 200 to 300 tons, can be had, full prices are freely paid. This applies to every description of Iron that is made, so that a consumer may have to make a good many applications before he can get a quotation of any kind, and the price named depends entirely upon the circumstances in each individual case. There is a somewhat less confident feeling as to the later months of the year, so that the actual amount sold from day to day does not total any considerable tonnage. A great many sales are required to make a total of 1000 tons, which under ordinary circumstances would be regarded as a very small matter, but the lots taken are mostly for immediate shipment to tide over an emergency. Most of the Iron which should now be in course of delivery was bought at much lower figures than those that are quoted to-day, so that there are several reasons why consumers should be persistent in asking for quick shipments. The furnaces are a long way behind, however, and find it physically impossible to deliver all the Iron which they have contracted for, and from present appearances they are not likely to do any better for some time to come. If there is any improvement, it will have to come from decreased consumption, of which at the present time there are no indications. Prices for the third and fourth quarters are materially lower than those quoted for earlier shipments, but consumers are not greatly interested in anything beyond getting enough material from week to week to keep their plants fully employed. This, however, is about as difficult as it has been at any time within the past six or eight months, so that it is evident that consumption has not commenced to fall off yet, and so far as can be seen it is not likely to do so in the very near future. But as regards the later months of the year, makers of Pig Iron are not disposed to negotiate for business which would involve serious concessions in prices, although, as shown by the quotations below, they are willing to do something better for late shipments, but they offer no great inducements under the impression that they may do better than some think that they will be able to do. The scarcity of spot Iron has continued so long that there is a possibility that it may extend more or less through the entire year, so that it is not worth reducing prices until the time comes when they are likely to have a surplus. Consumers are equally conservative and are inclined to take their chances of the future just as much as sellers are. Enough Pig Iron has already been bought to cover the requirements of consumers as far as they have orders for finished products, and they will only purchase from this time forward in proportion to the new business which they may be able to enter. Taking the situation as a whole, the attitude is defensive on both sides, which will probably continue until there are some developments which will show the course of the market more clearly than can be seen to-day.

Pig Iron.—It would be difficult to find wherein there has been any material change in conditions during the past week or two. Scarcity for early delivery is the most prominent feature, and is probably more pronounced to-day than it has yet been as regards Gray Forge and Basic. Foundry grades are also scarce, and in cases of emergency buyers still have to pay in the neighborhood of $26 for March and April shipments, but there are some indications that the period of extreme scarcity for this class of Iron is passing away. For deliveries during the second quarter there is certainly a slight modification from the extreme figures that were quoted some time ago, although such deliveries still command a premium of $1 to $2 per ton over the third and fourth quarters of the year. This is probably due to the continuous arrivals of Middlesbrough Iron, which has been available at about $22 on dock. This grade of Iron may not be all that buyers would like as regards quality, but it is on the spot ready for immediate shipment, and the difference in price of $2 or $3 a ton is an important item. The continued weakness in the foreign markets indicates that this Iron can be brought in at somewhat lower prices than are now quoted, so that if domestic Irons continue scarce the use of foreign Irons will no doubt keep the price of American Iron from making further advances. There is less disposition on the part of consumers to place orders for the last half of the year, and while prices are unchanged the outlook is not quite as strong as it was a few weeks ago. The cost of production will undoubtedly be higher than it has been for many years, so that any material decline from present prices is not an immediate probability, although, in case of increasing supplies, prices will have to yield something. Sales during the week have been of very small tonnage for two reasons: First, there was very little Iron for sale for such deliveries as buyers require, and second, for deliveries that they have no immediate use for they are disposed to remain in the background until the outlook becomes less obscure. Basic Iron has hardly been mentioned the past few days, but there is little doubt that it could be placed at something over $25 for second quarter. One lot of several thousand tons of Gray Forge was taken at $23.50 delivered to a mill in Schuylkill Valley. This grade is extremely scarce, and prices appear to be a good deal out of proportion with other grades. The general range of quotations for delivery in buyers' yards in eastern Pennsylvania or adjoining territory is about as follows:

Second Quarter 1907.	
No. 2 X Foundry	$25.25 to $25.50
Standard Gray Forge	23.00 to 23.50
Basic	24.25 to 25.00
Low Phosphorus	27.00 to 27.50
Middlesbrough, on dock	21.50 to 22.00
Third Quarter 1907.	
No. 2 X Foundry	$24.25 to $24.75
Standard Gray Forge	22.50 to 22.75
Basic	24.00 to 24.50
Low Phosphorus	27.00 to 27.25
Fourth Quarter 1907.	
No. 2 X Foundry	$23.25 to $23.75
Standard Gray Forge	22.00 to 22.25
Basic	23.50 to 23.75
Low Phosphorus	26.75 to 27.00

Ferroalloys.—The market is very unsettled, and prices for forward delivery are considerably lower. One sale of Ferromanganese for shipment during the last half of the year has been made at as low at $67. Spot lots would bring probably about $72, but it would all depend upon whether any one was in urgent need or not.

Steel.—The demand is good and prices are firm. Some good sized sales have been made at the full prices last week—namely, $33 to $34 for Soft Steel—according to quantity and delivery, and $35 to $40 for Forging Steel. Prospects for a continued active demand are quite favorable, and the mills are somewhat urgently pushed for prompt shipments.

Plates.—Mills are very busy, and are running to their fullest capacity, mostly on orders taken some time ago. New business is not as heavy as it was some time ago, but there is still a good average demand, and prices are unchanged as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge aand Boat Steel	2.13½	2.18½
Flange or Boiler Steel	2.23½	2.28½
Marine	2.53½	2.58½
Locomotive Firebox Steel	2.63½	2.68½

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G	.15
No. 9, B. W. G	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00

Structural Material.—There is a good deal of local work to come out within the next week or two, which will insure continued activity in this department of business. One architect in this city is said to have $6,000,000 worth of work behind him, besides which there is the usual active distribution of small and medium sized orders for the general trade, so that prospects in this department may be considered better than for a good many weeks past. Prices are unchanged, at 1.83½c. to 2c. for Beams, Angles and Channels, according to specifications.

Bars.—There is a fairly good demand, but prices are somewhat irregular. Most of the leading mills are holding for 1.93½c., but in several instances one-half tenth less has been accepted, when the orders appear to be of a desirable character. Steel Bars are firm and prompt deliveries would bring the same prices as Refined Iron, although for shipments after midsummer about 1.73½c. is quoted, but buyers are more anxious for the earlier deliveries, so that the last named quotation is more or less nominal.

Sheets.—The demand is fully maintained, and the mills are working up to full capacity, but even then have some difficulty in meeting the demands for prompt deliveries. Prices are unchanged as last quoted, which are as follows for mill shipments, with a tenth additional for small quantities: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—Prices are not essentially changed from the quotations of last week, but the market has a dull appearance and the lots taken at current quotations are not of any great importance, and as a rule it may be said that the tendency is somewhat in the direction of lower quotations. Bids and offers for deliveries in buyers' yards are about as follows:

Steel Crops and Rails	$19.25 to $19.50
No. 1 Steel Scrap	19.00 to 19.50
Low Phosphorus	22.50 to 23.00
Old Steel Axles	22.00 to 22.50
Old Iron Axles	31.00 to 32.00
Old Iron Rails	27.00 to 28.00
Old Car Wheels	23.25 to 24.00
Choice No. 1 R. R. Wrought	21.00 to 22.00
No. 1 Yard Scrap	19.00 to 20.00
Long and Short	18.75 to 19.00
Machinery Scrap	22.25 to 22.75
Wrought Iron Pipe	16.50 to 17.25
No. 1 Forge Fire Scrap	17.00 to 17.25
No. 2 Light	11.75 to 12.00
Wrought Turnings	16.50 to 17.00
Axle Turnings	17.00 to 17.25
Stove Plate	16.75 to 17.25
Cast Borings	15.00 to 15.50
Grate Bars	15.75 to 16.25

Birmingham.

BIRMINGHAM, ALA., March 10, 1907.

Pig Iron.—The market is unquestionably stronger this week than for some time. A conservative estimate of the amount of business booked the past two weeks places it at 40,000 tons. A small part of this was for spot shipment and several thousand tons for second quarter, but by far the larger part is for delivery during the third quarter of the year. A few contracts extend through the last half, but these as a rule are from the smaller melters, the larger buyers being content to cover for not longer than third quarter at the present time. Prices prevailing this week have been about as follows: Spot, $22.50; second quarter, $21 to $22; third quarter, $18.50 to $19; last quarter, $18.50. Several of the producers have advanced prices on third quarter, and every interest in the district with but two exceptions is asking $19 for this delivery. These concerns are still quoting $18.50, but state the amount they have to offer is very limited. From the recent sales and the large number of inquiries now being received, it would seem that the producers have again won over the melters. The orders booked up to and including the third quarter will take a very large percentage of the estimated production of the furnaces, and unless there is some abnormal change in business conditions over the country it is very probable that we will see higher prices before we do lower ones. Already the more desirable brands have been booked for more than the next six months, and even the less desirable cannot be secured so readily. This, however, is not due so much to a lack of Iron as to the determination on the part of the sellers to withhold a larger percentage than heretofore to sell as spot Iron. This, in view of the business already booked, is feasible. There is possibly a slight improvement in the car situation this week.

Cast Iron Pipe.—Detroit, Mich., will open bids on the 13th inst. for about 6000 tons of Water Pipe, and Atlanta, Ga., is advertising for about 10,000 tons of Pipe and Specials, the contract for which will be let April 10. Nothing smaller than 8-in. is specified on this contract, and the larger portion is to be 36-in., making it most desirable business, as the foundries in this district are booked well ahead on the smaller sizes. There is no falling off in orders, and the market is exceedingly firm. Quotations on Water Pipe are about as follows, per net ton: 4 to 6 in., $35; 8 to 12 in., $33; over 12-in. average, $31, with $1 per ton extra for Gas Pipe.

Old Material.—The demand for all grades of Cast continues good, but there is little improvement in other lines. There has been more demand for Rails the past week than for some time, and several nice sales have been reported. Dealers are inclined to take an optimistic view of the situation, and while good stocks are on hand they prefer to hold them rather than make concessions. Quotations are approximately as follows, per gross ton, f.o.b. cars here:

Old Iron Rails	$21.00 to $21.50
Old Iron Axles	18.50 to 19.00
Old Steel Axles	16.50 to 17.50
Old Car Wheels	18.50 to 19.00
No. 1 Railroad Wrought	18.00 to 18.50
No. 2 Railroad Wrought	13.50 to 14.00
No. 1 Country Wrought	13.50 to 14.00
No. 2 Country Wrought	12.00 to 12.50
Wrought Pipe and Flues	13.00 to 13.50
Railroad Malleable	13.00 to 13.50
No. 1 Steel	14.00 to 14.50
No. 1 Machinery Cast	15.00 to 15.50
Stove Plate and Light Cast	12.00 to 12.50
Cast Borings	8.00 to 8.50

Cincinnati.

FIFTH AND MAIN STS., March 13, 1907.—(*By Telegraph.*)

Pig Iron.—The market during the past week has assumed a somewhat brighter aspect, with considerably more interest manifested, especially so far as prompt shipment Iron is concerned. Reports indicate that there has been quite a considerable movement in Malleable Bessemer and Basic Irons, particularly the former, the available supply of which is said to have been practically contracted for up to July 1. The situation so far as Southern Foundry grades is concerned has also developed more inquiry, and as the matter of equipment for moving the tonnage from the yards of producers shows no improvement there is absolutely nothing in sight that gives promise of any change for the better for some time to come. Sales made for prompt delivery during the week comprise an aggregation of small lots, and have come forward without the formality of a general inquiry. Quite a number of melters who up to the present time have insisted that they have sufficient Iron to carry them well into the third quarter have deemed it advisable to recede from their former position, and are now feeling the market with a view to covering current needs. Taken as a whole, the consensus of opinion appears to be that the undercurrent and general tone of the situation are much stronger than a week or two since, at which time the bulk of the business was apparently being taken by a few of the larger concerns with little inquiry from the smaller consumers. Prices have shown no change, $18.50 representing the minimum for the second half, and $23 for spot for No. 2, Birmingham. Northern Irons are said to be exceedingly strong with the available supply for last half very meager. Freight rates from the Hanging Rock District to Cincinnati are $1.15, and from Birmingham $3. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1	$26.50 to $27.00
Southern Coke, No. 2	26.00 to 26.50
Southern Coke, No. 3	25.50 to 26.00
Southern Coke, No. 4	25.00 to 25.50
Southern Coke, No. 1 Soft	26.50 to 27.00
Southern Coke, No. 2 Soft	26.00 to 26.50
Southern Coke, Gray Forge	23.00 to 23.50
Southern Coke, Mottled	22.00 to 22.50
Ohio Silvery, 8 per cent. Silicon	31.15 to 31.65
Lake Superior Coke, No. 1	26.65 to 27.15
Lake Superior Coke, No. 2	26.15 to 26.65
Lake Superior Coke, No. 3	25.65 to 26.15
Car Wheel Irons.	
Standard Southern Car Wheel	$29.00 to $29.50
Lake Superior Car Wheel	27.50 to 28.00

Coke.—The market is fairly active, most of the business, however, being contract shipments. The average daily supply moving is said to be quite satisfactory, and is sufficient to take care of current requirements. We quote the best brands of Connellsville and Virginia Foundry Coke from $4 to $4.25, f.o.b. ovens.

Finished Iron and Steel.—The situation is unchanged, order books showing sufficient business to carry mills practically through the year. New contracts are coming forward in a satisfactory manner and the outlook is all that could be desired. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.93c., half extras, and in smaller lots, 2.10c., full extras; Steel Bars, carload lots, 1.73c., half extras, and in smaller lots, 1.95c., full extras; Base Angles, carload lots, 1.83c.; Beams and Channels, carload lots, 1.83c.; Plates, ¼-in. and heavier, carload lots, 1.83c., and in smaller lots, 2c.; Sheets, No. 16, carload lots, 2.15c., and in smaller

lots, 2.70c.; No. 14, carload lots, 2.05c., and in smaller lots, 2.60c.; Steel Tire, 1 x ¼ in. or heavier, 1.93c. in carload lots.

Old Material.—The demand is strong and the market is very active. Dealers complain of being unable to secure sufficient Scrap to meet the demand and prices are very firm. We quote dealers' prices, f.o.b. Cincinnati, as follows:

No. 1 R. R. Wrought, net ton	$18.50 to $19.00
Cast Borings, net ton	10.00 to 10.50
Steel Turnings, net ton	12.00 to 13.00
No. 1 Cast Scrap, net ton	18.00 to 18.50
Old Iron Axles, net ton	26.75 to 27.75
Old Iron Rails, gross ton	27.00 to 27.50
Old Steel Rails, long, gross ton	19.25 to 20.25
Relaying Rails, 56 lb. and up, gross ton	28.75 to 29.75
Old Car Wheels, gross ton	24.00 to 25.00
Low Phosphorus Scrap, gross ton	21.25 to 21.75

The Woodstock Iron & Steel Corporation, Anniston, Ala., expects to have one of its furnaces ready to blow in by April 1, at which time it will commence repairing the other one. John W. Hood, who has been connected with the Queen & Crescent Railroad as secretary to General Manager W. J. Murphy, will on March 15 sever his connection with that company and take service with the Domhoff & Joyce Company, Cincinnati, in the sales department. E. C. Humphreys, who has been connected with this firm in the capacity of sales agent, has been made a member of the firm and elected secretary in connection with his other duties. The official staff of the company now stands: C. H. Domhoff, president and treasurer; John Sargeant, vice-president; E. C. Humphreys, secretary; C. H. Jenkins, assistant secretary and treasurer.

Cleveland.

CLEVELAND, OHIO, March 12, 1907.

Iron Ore.—The movement from the Lake Erie docks has increased a great deal the past few days, and is expected to be very heavy during March. The stocks of some of the furnaces that had a good supply early in the season are now getting low, and there has been a large increase in shipping orders. Quite a number of applications for first cargoes have been received by Ore shippers, and if the opening of navigation is late, as is expected now, the stocks at the furnaces will be very low. Vesselmen do not expect that boats will be able to reach Lake Superior before April 20, and it is doubtful whether any Ore will be brought down to Lake Erie ports before May 1. The opening of navigation will find the docks cleaned up fully as well as a year ago, if not better, and as there will be a good demand for Ore from the start many cargoes will be rushed forward directly from the boats. Ore shippers are not worried over the present strike in the shipbuilding yards of the Great Lakes. They say that if it should continue any length of time, and delay the putting into commission of some of the new Ore carriers now being built, it would have no serious effect on the movement of Ore, because the present vessel tonnage is very satisfactory. The Ore market continues quiet. There is no buying of next season's Ore, and inquiries for Ore on the docks for prompt shipment to fill out supplies at furnaces appear to have ceased for the time being. Ore prices for 1907 deliveries remain unchanged. Nominal quotations at Lake Erie docks are as follows per gross ton: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.25; Mesaba non-Bessemer, $4; Siliceous Bessemer, $2.75; Siliceous non-Bessemer, $2.50.

Pig Iron.—The Northern Foundry Iron market is rather quiet, but prices are firm, being fully as strong as they have been at any time in the past month. The inquiries for spot shipment Iron continue quite numerous, and there have been some sales of Northern Foundry No. 2 during the week for immediate delivery at $25 at furnace, and some dealers are asking $1 more for spot shipment. A number of sales in small lots for May and June delivery have been made at $23 at furnace. One furnace is refusing to sell No. 2 Foundry for less than $25 for the second quarter, preferring to hold it with the expectation of getting that price for the Iron for prompt shipment, the second quarter being so near at hand. The Foundry Iron market is inactive as far as the second half is concerned, there being practically no inquiries at present. Further absence of inquiries seems to bear out the statements previously made that the foundries in this district have pretty well covered for the second half. The price for the last half is firm at $22 to $22.50 at furnace, the latter price being generally asked for the third quarter. A number of the furnaces are still behind with deliveries, and they are receiving numerous complaints from the foundries, indicating that the latter have scant supplies and are melting their Iron about as fast as it is received. There is no change in the Bessemer and Basic situation, and furnaces making these Irons in this district are as yet receiving no inquiries for second half delivery. The recent purchase of Bessemer Pig by the Steel Corporation has tended to make the Bessemer Iron makers more firm in their stand that they will not sell for last half delivery for less than $22, Valley furnace. Southern Iron prices continue firm, and some sales of No. 2 Foundry have been made during the week at the prevailing price of $18.50, Birmingham, for second half delivery. Quotations for the last half of 1907, f.o.b. Cleveland, are as follows:

Bessemer	$21.50 to $22.00
Northern Foundry, No. 1	22.50 to 23.00
Northern Foundry, No. 2	22.00 to 22.50
Northern Foundry, No. 3	21.50 to 22.00
Southern Foundry, No. 2	22.85 to 23.35
Gray Forge	21.00 to 21.50

Coke.—The market is quiet, with no change in prices. Consumers seem to be pretty well covered for the first half and there are very few inquiries for the second half. Furnace Coke is selling at $3.75, at oven, and Foundry Coke is quoted at $4, at oven, for first half delivery.

Finished Iron and Steel.—The heavy demand for everything in this line continues, with no indication of a let up. Specifications have come in in a very satisfactory manner during the week, and there have been a large number of orders for quick shipment at premium prices. There is not much buying for second half delivery, and the mills that are not already overcrowded are not anxious to book orders for delivery for the latter part of the year at the prevailing prices. All deliveries are growing worse and a slackening of the buying movement, that some mills expected would come and give them a chance to catch up a little, has not appeared. The heaviest demand at present seems to be for Steel Bars. A sale of 2000 tons of Steel Bars at 1.85c., Pittsburgh, for prompt shipment was made in the local market this week. Other mills are asking 1.80c., Pittsburgh, for Steel Bars for quick delivery. The Bar Iron situation is somewhat easier and one mill is quoting Irons Bars at 1.70c. to 1.75c., Pittsburgh, and promises deliveries within two or three weeks. Some of the smaller mills can make deliveries on Steel Bars in from two to four months. For future delivery Iron Bars are quoted at 1.89½c., Cleveland, and Steel Bars at 1.69½c., Cleveland. There is not a great deal of buying for future delivery. Plate deliveries are worse and are not promised within about 90 days. Some dealers are asking $4 to $5 a ton premium for Plates for prompt shipment and others are quoting Plates at 2c., base, Pittsburgh, for deliveries within two or three weeks. Deliveries on Sheets are not promised now within five months. Jobbers report that they are forced to pay from $4 to $7 premium to some of the smaller mills for prompt shipment to replenish their stock, and that because of the high premium they make little profit at the present stock prices. The demand for Structural Material is improving, but the mills are in good shape and consumers can get almost anything they want without much delay. Sales are made on the basis of 1.70c., Pittsburgh. Forging Billets continue scarce and are quoted at $38 to $42, Cleveland. The demand on local warehouses for all kinds of Finished Material out of stock continues heavy. Local stock prices remain unchanged. Steel Bars are quoted at 1.95c. to 2c. and Iron Bars at 2c., out of stock. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28, One Pass Cold Rolled, 3.05c.; No. 28, Galvanized, 4.15c. The jobbers' price on Boiler Tubes, 2¾ to 5 in., is 64 per cent. discount.

Old Material.—The demand for Cast Borings and Turnings continues good, with Pittsburgh dealers in the market for all the available supply to fill orders that have been placed with them by the large Steel mills. No. 1 Cast Scrap is in fairly good demand, and has advanced slightly. Otherwise the Old Material market is very quiet, there being few, if any, inquiries. Nominal prices remain unchanged. The railroads are offering considerable Old Material for sale, but are not accepting offers made by local dealers. The following are dealers' prices to the trade per gross ton, f.o.b. Cleveland:

Old Steel Rails	$17.50 to $18.00
Old Iron Rails	23.50 to 24.50
Steel Car Axles	21.50 to 22.50
Old Car Wheels	21.50 to 22.50
Relaying Rails, 50 lb. and over	29.00 to 31.00
Relaying Rails, under 50 lb.	31.00 to 32.50
Heavy Melting Steel	17.00 to 17.50
Railroad Malleable	17.50 to 18.50
Agricultural Malleable	15.50
Light Bundled Sheet Scrap	16.00 to 17.00
Bundled Tin Scrap	17.00 to 19.00

The following quotations are per net ton, f.o.b. Cleveland:

Old Car Axles	$29.25 to $29.75
Cast Borings	10.50 to 11.00
Iron and Steel Turnings and Drillings	13.00 to 13.50
No. 1 Busheling	14.50 to 15.00
No. 1 Railroad Wrought	17.50 to 18.00
No. 1 Cast	18.50 to 19.00
Stove Plate	14.00 to 14.50

The Shenango Furnace Company, Pittsburgh, operating four blast furnaces at Sharpsville, Pa., has recently built a number of coke ovens at Wilpen, Pa., in the Connellsville region. At present 30 ovens are in blast and 70 more will be started within a short time. This company will have eventually 400 coke ovens at Wilpen, the greater part of the output of which will be used by its blast furnaces at Sharpsville.

Pittsburgh.

PARK BUILDING, March 13, 1907.—(*By Telegraph.*)

Pig Iron.—The past week has been quiet in the Pig Iron market, no large sales having been made in this district. The recent purchase of 5000 tons of Bessemer by the Carnegie Steel Company at $22, Valley furnace, for March delivery, has had the effect of strengthening the Bessemer market, and with a prospect of further purchases by one or two Steel concerns for second quarter delivery it is believed the market will be sustained on the present basis up to July at least. As yet the views of producers and consumers of Bessemer and Basic Iron as to prices for second half delivery are far apart and nothing has been done for that delivery. It is recognized by both buyers and sellers that Bessemer or Basic Iron at $22, at furnace, is relatively high, and it would seem that consumers will not be interested in the market for second half delivery at this price. We quote Bessemer and Basic Iron for March and April delivery at $22, Valley furnace, and note that either kind of Iron for prompt delivery is hard to find. Malleable Bessemer for prompt shipment is held at about $22.50, Valley furnace, and there is a fair inquiry. We quote Northern No. 2 Foundry for March and April shipment at $24, and for second quarter delivery at $23 to $23.50, Valley furnace. Northern Forge Iron is firm on the basis of $21, Valley furnace, or $21.85, Pittsburgh.

Steel.—The situation as regards the supply of Steel seems to be getting tighter, and prices are very firm. We quote 4 x 4 Bessemer Billets at $29 to $29.50 and Open Hearth about $31.50, Pittsburgh. Sheet and Tin Bars in random lengths are held at $30 to $30.50, Pittsburgh or Youngstown mill.

(*By Mail.*)

The general feeling in the whole Iron trade is distinctly better. The new business now being placed in nearly all kinds of Finished Iron and Steel is running up a huge tonnage, and the mills seem to be getting further behind in deliveries. In the Pipe trade the mills are simply overwhelmed, and the National Tube Company has withdrawn prices. It will not take any more orders for Tubular goods except for delivery after June 1, prices to be fixed in that month. Other mills have made an advance of one point or more in Steel Pipe, and one point or more in Iron Pipe. Mills are getting further behind in deliveries on Steel Plates and Steel Bars, but could take care of more tonnage in Structural Shapes. The demand for Sheets and Tin Plate is abnormally heavy, and the mills have a large tonnage on their books for second quarter delivery and in some cases into third quarter. The Wire mills are congested with orders and are much behind in deliveries. The entire situation as regards Finished Iron and Steel is strong, and prices are very firm, with prospects of advances before long on such lines as Sheets, Tin Plate and Wire Products. In Pig Iron the tone of the market is decidedly stronger and inquiries are better. A buying movement in Pig Iron is confidently expected in the latter part of this month or early in April, as it is known that some large consumers have not covered their wants for second quarter. Bessemer Pig Iron for March and April delivery is firm at $22, Valley furnace, while Malleable Bessemer, for which there is a good demand, is held at $22.50 to $23, Valley furnace, for prompt shipment. The Steel market is also strong and Steel seems to be getting scarcer. Leading makers of Billets and Sheet and Tin Bars are sold up through the second quarter, and are very firm in their ideas as to the future of the market. The Scrap trade is showing betterment, both in demand and prices, and a larger tonnage is moving. Coke has gone off some in prices, owing to the heavy output and a slight falling off in demand, due to the blowing out of some blast furnaces which threw some surplus Coke on the market.

Ferromanganese.—A local consumer recently bought 150 tons of 80 per cent. foreign, equal deliveries over last six months of the year on the basis of $68, Baltimore, or $69.92, Pittsburgh. The market for forward delivery is firm, while some sellers are asking higher figures. Prompt 80 per cent. is held at about $73, Baltimore, or $75, Pittsburgh.

Muck Bar.—The demand is active, and the available supply limited. We quote best grades of Muck Bar made from all Pig Iron at $37, Pittsburgh, while Bar made from part Scrap is held at $33 to $34, Pittsburgh.

Rods.—These are almost impossible to obtain, and prices are merely nominal, these depending altogether on the tonnage and deliveries wanted. We quote Bessemer Rods at $37 to $38, and Open Hearth $38 to $39, Pittsburgh, forward delivery.

Skelp.—None of the Skelp mills is in position to take any orders for delivery inside of three or four months. Prices continue firm, and in view of the heavy demand and sold-up condition of the mills will likely be higher. We quote: Grooved Steel Skelp, 1.90c. to 1.95c.; Sheared Steel Skelp, 2c. to 2.05c.; Grooved Iron Skelp, 2.15c.; Sheared Iron Skelp, 2.25c., all f.o.b. Pittsburgh.

Steel Rails.—The new tonnage being placed continues small, the Carnegie Company having taken only about 10,000 tons in the past week, most of this being for traction lines. However, the company is filled up on Standard Sections and on Light Rails to July. We quote Light Rails as follows: $33 to $34 for 20 to 45 lb.; $34 to $35 for 16-lb., and $35 to $36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at $28, at mill.

Structural Material.—No large contracts of importance have been placed the past week, and, in fact, the Structural trade is somewhat quiet at present, several of the leading concerns being in position to take care of a larger business if they had it. Deliveries by the mills on Steel Bars and Plates are very unsatisfactory and they are getting further behind, but on Structural Shapes they are making reasonably prompt shipments. The McClintic-Marshall Construction Company has taken a socket shop for the Youngstown Sheet & Tube Company, about 500 tons; some bridge work for the Central Railroad of New Jersey, and a crane runway for the Pennsylvania Railroad. The American Bridge Company has taken 600 tons of bridge work for the Baltimore & Ohio Railroad, 3200 tons of Steel for the new shops of the Grand Trunk Railway at Battle Creek, Mich., and about 2500 tons for San Francisco. Prices are firm and we quote: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card, Angles, Channels and Tees under 3-in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—It is the old story in Plates, the mills being congested with tonnage and getting further behind in deliveries. Premiums of $2 to $3 a ton continue to be paid for prompt shipment. For forward delivery we quote: Tank Plate, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.70c. to 1.80c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—We note a continued heavy volume of new business in both Black and Galvanized Sheets, and the latter are very firm, owing to the high prices ruling for Spelter. Prices continue firm, and where mills are in position to make prompt shipments slight premiums are sometimes obtainable. The leading Sheet mills are well sold up through the second quarter and have some tonnage on their books for third quarter. Sheet Bars continue scarce, and the mills are still having trouble to some extent in getting Steel as fast as needed. We quote: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 28 Gauge Painted Roofing Sheets at $1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, $3.25 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Hoops and Bands.—The mills are filled up so far ahead on contracts on which buyers are specifying freely that prompt deliveries continue to command from $1 to $2 a ton premium over fixed prices, which for forward delivery are as follows: Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of $2 a ton being charged for less than carloads.

Tin Plate.—The demand for Tin Plate for second quarter delivery has been extremely heavy for some time, and the leading mills are not only well sold up for that delivery, but also have a heavy tonnage on their books for third quarter delivery, for which a premium of 10c. per base box has been paid by leading consumers. Indications are that present high prices of Tin Bars and Pig Tin will continue through the second quarter at least and possibly longer, and for this reason an advance in prices of Tin Plate of about 10c. per base box, to be made at an early date, is generally anticipated by the trade. We quote: $3.90 for 100-lb. Cokes, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Iron and Steel Bars.—The market continues extremely active, the railroads and other large consumers placing heavy contracts for both Iron and Steel Bars for forward delivery. The business placed so far this month has been heavy, and none of the leading mills making Steel Bars are in position to promise deliveries inside of six to eight weeks, while some are filled up to July or longer. It does not seem probable that the Steel Bar mills will grant any concessions in prices to the large implement makers, such as was done last year, and which created much confusion and dissatisfaction in the trade. Should the mills refuse to grant any concessions it is probable that leading consumers who contract about this time for their season's requirements will adopt the policy of buying from hand to mouth for a time, in order to test the market thoroughly. Indications are that wages for puddling will be higher after July 1, as the puddlers in the Western Bar mills have decided to withdrawn from the Amalgamated Association and reorganize the old Sons of Vulcan, and are understood to favor asking the manufacturers for a higher rate of wage for boiling. We quote Refined Iron Bars at 1.80c., Pittsburgh, and Steel Bars at 1.60c., base, half extras, f.o.b. Pittsburgh, these prices being for forward delivery. For prompt shipment premiums of $1 and $2 a ton are asked.

Railroad Spikes.—The demand for standard sizes, which has been somewhat quiet, has increased perceptibly, and large orders are now being placed by the railroads for both standard and the smaller sizes. Prices are firm, and we quote standard sizes at $2.40 to $2.45, and the smaller sizes at $2.50 to $2.60 per 100 lb. For prompt shipment premiums of $1 to $2 per 100 lb. are being paid.

Merchant Steel.—An item of interest in this trade is whether the leading Steel Bar mills will consent to allow the large implement makers an opportunity to contract for their supply of Steel Bars and other Shapes at less than regular prices, which are based on 1.60c. Pittsburgh, for Steel Bars, base sizes. The fact that the leading Bar mills are filled up for months would seem to preclude any probability of a concession in prices. New business is fairly heavy, while specifications on contracts are coming in freely, and the market is firm. We quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. The demand for Shafting is reported active, and prices are fairly well maintained. We quote Cold Rolled Shafting at 50 per cent. off in carloads, and 45 per cent. in less than carloads, delivered in base territory.

Spelter.—We note a sale of 100 tons of prime grade Western Spelter for forward delivery at 6.85c., Pittsburgh, equal to 6.72½c., St. Louis. The market on forward shipments is firm at this price, while for spot delivery 6.85c. to 6.90c., St. Louis, is being quoted.

Pipes and Tubes.—There is a deluge in orders for Pipe and a famine in supply, the mills being simply congested with tonnage and getting further behind in shipments. The pressure for Pipe has become so great that the National Tube Company has withdrawn prices on Steel Pipe and Merchant Tubes, and has notified its trade that no more orders will be booked for shipment prior to June 1, prices to be fixed at the time of shipment of order. The outside Pipe mills have also withdrawn prices, and are quoting from $2 to $4 a ton advance, depending on the order and deliveries wanted by the customer. In the present condition of the market we have decided to omit our usual table of discounts on Iron and Steel Pipe, as there are no standard prices in effect at this writing. We may say in a general way that the extreme discount on Merchant sizes of Iron Pipe is now 69 per cent. off for ¾ to 6 in., on which a half point additional is sometimes allowed to the very large trade. The extreme discount on Merchant sizes of Steel Pipe, that is from ¾ to 6 in., is about 75 and 5 per cent., but some mills are asking higher figures. Spang, Chalfant & Co., Incorporated, expect to stare their new Butt Weld Pipe mill March 19, and this mill will make from ⅛ to 3 in. Pipe, both Black and Galvanized. An inquiry was in the market recently for 40 miles of 16-in. Line Pipe, but was withdrawn for certain reasons. It is expected to come up again in the near future.

Boiler Tubes.—The National Tube Company has withdrawn prices on Merchant Tubes, and will not take orders for delivery prior to June 1. Other mills are asking higher prices, and while we have not advanced our discounts we may state that business is being entered at $2 a ton or more advance over recent discounts, which are now largely nominal, and which are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	41	47
1¾ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 5 in.	52	65
6 to 13 in.	42	59

Iron and Steel Scrap.—The Pennsylvania Lines West marketed a large tonnage of Scrap last week, for which it secured relatively high prices. Included in the tonnage sold was 1000 tons rerolling Rails at $19.50; 500 to 600 tons of Railroad Wrought Iron Scrap at $20; 300 tons of Machine Shop Turnings at $15.10; 200 tons of Cast Iron Borings at $14.25; 300 to 400 tons of Car Wheels at $25; some Steel Axles at $22.50; 200 tons of Grate Bars at $17; 100 tons of Iron Axles at $31.50, and some Railroad Malleable Iron Scrap at $20.25. This tonnage was disposed of to various Scrap dealers, prices being in all cases in gross tons, f.o.b. Pittsburgh. We also note a sale of 500 tons of Cast Iron Borings at $14.35, Pittsburgh, and note that owing to heavy demand prices on this material are now firm, at about $14.50, Pittsburgh. The Wheeling & Lake Erie Railroad has also disposed of a round tonnage of Scrap, details as to tonnage and prices not yet being ready. The Scrap trade is showing marked improvement, demand being better and prices firmer, while on most lines of Iron Scrap prices are higher. It is believed that the downward tendency of prices has been checked and that higher values are in sight. The whole market is quite firm, dealers now quoting as follows: Heavy Steel Scrap, $18 to $18.25, for Pittsburgh, Sharon or Steubenville delivery; No. 1 Wrought Iron Scrap, $19.50; No. 2, $18; Old Steel Rails, short pieces for Open Hearth purposes, $18 to $18.25; Old Steel Rails, rerollers, $19.75 to $20; Machine Shop Turnings, $15.75 to $16; Bundled Sheet Scrap, $16.75 to $17; Tin and Terne Plate Clippings, $18.50 to $19 in net tons. Low Phosphorus Melting Steel is $22; Cast Iron Borings, $14.50; Old Car Wheels, $24.50 to $25; Steel Axles, $22 to $22.50; No. 1 Cast Scrap, $21.50; Grate Bars, $17; Stove Plate, $16.50. All above prices are in gross tons, f.o.b. Pittsburgh, unless otherwise noted.

Coke.—As noted last week, prices on both Furnace and Foundry Coke are lower, this being due to the enormous output and a full supply of cars, the railroads never furnishing as good service as regards cars as they have been doing for some time. We quote strictly Connellsville Furnace Coke for prompt shipment at $3 to $3.25 and 72-hr. Foundry at $3.75 per ton at oven. For forward delivery, best grades of Connellsville Furnace Coke are offered as low as $2.90 and 72-hr. Foundry at $3.50 per ton at oven. The output of Coke continues heavy, the Upper and Lower Connellsville regions having made last week 411,257 net tons. There are 33,859 ovens in both Connellsville regions, and last week 32,080 were active and only 1779 idle. Coke oven building in the Connellsville regions, and also in the outside Coke districts, is very active, and within a few months the producing capacity will be very materially increased.

Manganese-Zinc.—A new alloy of manganese and zinc for use as a deoxidizing agent in the manufacture of brass and German silver is being placed on the market by H. M. Shimer & Co., Philadelphia, Pa. This alloy contains 85 per cent. zinc and 15 per cent. manganese and melts at 900 degrees F. The zinc, when alloyed with this percentage of manganese, loses entirely its characteristic crystalline nature, the fracture of the alloy showing a very close grain. It is of a silver color and very brittle. In use, about 2½ per cent. of the alloy is taken, this displacing the same percentage of zinc in the mixture. On analysis the finished castings show but a trace of manganese, that element having passed off in combination with oxygen, either in a gaseous form or in the slag. The use of this new alloy, it is said, makes castings sharp and close grained, easily machined and with a material increase in ductility and the tensile strength.

The Brier Hill Iron & Coal Company, Youngstown, Ohio, has elected the following officers: George Tod, president; J. G. Butler, Jr., vice-president and general manager; R. C. Steese, secretary, and H. H. Stambaugh, treasurer. George Tod, J. G. Butler, Jr., H. H. Stambaugh, John Tod and David Tod constitute the Board of Directors.

New York.

NEW YORK, March 13, 1907.

Pig Iron.—The only really large inquiry now in the market is for 10,700 tons of Foundry Iron for a large electrical company, which, it is expected, will test the market thoroughly. We quote spot Northern Iron in small lots, $25.50 to $26.50 for No. 1 Foundry, and $24.50 to $25 for No. 2 Foundry. For the second quarter we quote $25 to $26 for No. 1 Foundry, $23.50 to $24 for No. 2 Foundry and $23 to $23.50 for No. 2 Plain. For the second half we quote $23 to $23.50 for No. 2 Foundry.

Steel Rails.—The principal contract of the week was 21,500 tons for the Kansas City, Mexico & Orient Railroad. The Delaware & Hudson has bought 3000 tons additional, and in the Pittsburgh District scattering orders were taken amounting to 3500 to 4000 tons. The American Smelting & Refining Company is in the market for 3000 tons of 75-lb. Rails for new track in Nevada.

Structural Material.—The volume of specifications has been large in the past 10 days, and some of the new contracts closed call for deliveries in the latter part of the year. The New Haven Railroad placed nearly 5000 tons of bridge work last week, of which the greater part went to the Pennsylvania Steel Company. Other bridge awards include 400 tons for the Chicago, Lake Shore & Eastern and 200 tons additional for the Grand Trunk, both taken by the American Bridge Company, and 700 tons for the Pennsylvania Railroad. The Reading, Lehigh Valley, Central of New Jersey and the Erie either have bids in or are about to receive bids on a number of bridges. San Francisco has about passed through the period of temporary reconstruction, and is now getting well into a campaign of permanent rebuilding. In the past week the American Bridge Company got the contract for the Phelan Building, 1000 tons, and the Grant Building, 1300 tons. It will also furnish the Steel for an insurance company building at Springfield, Mass., 1000 tons, and for 1000 tons of new buildings for the American Sheet & Tin Plate Company. Continued activity is noted in new manufacturing construction throughout the country—cement plants, foundries, machine shops and other classes of industrial works. The construction of cement works is particularly active on the Pacific Coast. In New York City Milliken Bros., Incorporated, have taken the contract to erect a 12-story manufacturing building for the American Brass Foundry, calling for 2000 tons of Steel. It will be located at Lafayette and Howard streets. To-day the Borough of Manhattan opens bids for altering the Manhattan approach to the Williamsburg Bridge. From 800 to 1000 tons of Steel will be required. We quote, tidewater deliveries, mill shipments, as follows: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. and Angles over 6 in. the extra is 0.10c. Sales are made from stock of material cut to length at 2¼c. to 2½c.

Bars.—While the demand has been less active, owing largely to the flurry in the stock market, which naturally caused some apprehension of financial troubles, prices have been well maintained on the basis of 1.90c. to 1.95c., tidewater, for Bar Iron, and 1.84½c. to 1.94½c., tidewater, for Steel Bars, according to specifications and time of delivery.

Plates.—The local market has been quiet, with few inquiries, and these have called for small lots only. The range for tidewater delivery, taking the low price for future deliveries made by Western mills and the much higher rate named by Eastern mills, is as follows: Sheared Tank Plates, 1.84½c. to 2.14½c.; Flange Plates, 1.94½c. to 2.24½c.; Marine Plates, 2.24½c. to 2.44½c.; Firebox Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—The largest sale reported the past week was about 600 tons to a New England gas company at full prices. Transactions in smaller lots were fairly numerous. The local market, however, has been comparatively quiet, and this is ascribed to the continuance of inclement weather. A week or two of sunshine and drying weather will probably have a decidedly stimulating effect on trade. Foundrymen are so well supplied with orders that they are convinced that current prices will be maintained at least up to midsummer. Carload lots of 6-in., at tidewater, are quoted at $35 to $36 per net ton.

Old Material.—Heavy Melting Steel Scrap, Heavy Cast Scrap, Stove Plate, Cast Borings and Heavy Steel Turnings are in active demand. The supply of these grades is limited, and consumers having contracts are calling for more prompt deliveries. In numerous instances the sellers of all of these grades took chances on being able to cover at lower prices and are now having much difficulty in making shipments according to contract. Some of the Steel mills particularly are urging delivery on contracts and are threatening that if the material is not soon received they will go into the open market, make purchases and charge such losses as may accrue to those who failed to make delivery. The reports current that railroad companies are offering large lists of Old Material are said to be greatly exaggerated, and the supply coming from that quarter is much less than stated. Those who made sales of material which they did not have on hand are now finding themselves in a predicament, as the quantity of Old Material which had been expected to come on the market proves to be far under what had been anticipated. For some time all accumulations have been going directly into consumption, and the supply thus coming out has by no means been up to the ordinary demand. The fact that large mills owned by the United States Steel Corporation are freely purchasing Old Material in Pittsburgh and other districts, taking all grades which they can secure, because of the high prices and scarcity of Bessemer Pig Iron, is having a decided effect in stiffening the views of dealers, and higher prices are looked for. The market is therefore decidedly stronger than it has been, even No. 1 Railroad Wrought and No. 1 City Wrought being in better demand, with prices a trifle higher. Quotations per gross ton, f.o.b. New York, are as follows:

Old Girder and T-Rails for Melting	$16.25 to $16.75
Heavy Melting Steel Scrap	16.25 to 16.75
Old Steel Rails, rerolling lengths	18.50 to 19.50
Relaying Rails	28.00 to 29.00
Old Iron Rails	24.00 to 25.00
Standard Hammered Iron Car Axles	28.50 to 29.00
Old Steel Car Axles	20.50 to 21.00
No. 1 Railroad Wrought	20.50 to 21.00
Iron Track Scrap	18.00 to 18.50
No. 1 Yard Wrought, long	18.00 to 18.50
No. 1 Yard Wrought, short	17.50 to 18.00
Wrought Pipe	14.50 to 15.00
Light Iron	11.00 to 11.50
Cast Borings	12.50 to 13.00
Wrought Turnings	14.50 to 15.00
Old Car Wheels	22.50 to 23.00
No. 1 Heavy Cast, broken up	19.00 to 20.00
Stove Plate	16.00 to 16.50
Grate Bars	14.00 to 14.50
Malleable Cast	18.00 to 19.00

Metal Market.

NEW YORK, March 13, 1907.

Pig Tin.—Trade is not at all active and prices show declining tendencies. On the 7th Tin sold at 42.15c., advancing to 42.25c. on the 8th and declining to 42.10c. on the 11th, at which price Tin was also sold on the 12th. To-day Tin is slightly higher, following advancing prices from London, at 42.25c. The indications are that at the end of the month the Tin position will show some unfavorable developments, as the imports to this country will be large, and it is also believed that the shipments from the Straits will be heavy. The arrivals so far this month aggregate 2116 tons and there are afloat for American ports 2745 tons, of which over 900 tons will arrive on steamers from London or Rotterdam before March 19. The London market closes to-day at £192 5s. for spot and £190 15s. for futures. The disposition among consumers to limit their purchases more nearly to actual requirements seems to be in evidence in the Tin trade, more so, perhaps, than in any other.

Copper.—The market has again advanced, and Casting grades, which have been the laggard for months past, have been coming to the front rapidly. We revise quotations, as follows: For nearby shipments of Lake, 25.50c. to 25.87½c.; Electrolytic, 25.37½c. to 25.75c.; Casting grades, 24.87½c. to 25.25c. Of course for prompt deliveries premiums are demanded above these prices, and it is significant to note that cask lots of Lake can be readily sold at 27c., while the price of Electrolytic in small lots has been advanced to 26.50c. During the past fortnight the sale of a large amount of high grade Lake Copper has been effected, which went at 26c. and above, delivered in 30 days. Electrolytic Copper has been sold in Europe on a parity of 26c. The scarcity of Copper in European countries is almost as acute as in America at present, and the inquiry is increasing both here and abroad. The Amalgamated interests for the past three months have been unable to deliver more than two-thirds of their normal output, which goes far to account for the shortage. Sales of Electrolytic Copper for export have been made this week at 25.50c. The London market is again strong, closing at £110 7s. 6d. for spot and £111 10s. for futures, while Best Selected has made another new high record at £118. The exports for the first 12 days of the month are small, aggregating 5667 tons.

Pig Lead.—The market is practically unchanged, and strictly spot stocks command the high price of 6.35c. to 6.40c. Shipment Lead can be had on a basis of 6.25c., New York. In St. Louis the market is firm at 6.10c. The London market is again higher, closing to-day at £20. The American Smelting & Refining Company continues to accept orders only at price current on date of shipment, and it is very much behind on the matter of deliveries.

Spelter.—Strictly spot stocks in New York continue to be held at 7c., but future shipments can be had at 6.95c. In the West the market is very firm at 6.80c. to 6.85c., St. Louis. The demand is increasing.

Antimony.—Extremely low figures have been named for future deliveries of Antimony, but whether they were to test the market or to attract actual business cannot be learned. Sufficient to say, however, the market is decidedly weaker, Cookson's being sold at 24½c., Hallett's at 23½c. and other

brands at 22¾c. to 23½c. Shipments from Europe are being anticipated, and there is no complaint regarding the amount of metal on hand.

Ferroalloys.—The demand for Ferrosilicon is far in excess of the supply, and for small lots considerable premiums have been paid. Future deliveries continue on a basis of $110 to $112 per ton. There is but a small amount of 75 per cent. Ferrosilicon available, and this is firmly held. Sales have been made as high as $175 per ton, for small lots. Ferromanganese is a trifle firmer and $72 per ton has been done, f.o.b. Baltimore. Ferrochrome is unchanged, at $160 to $200 per ton, depending on the Chromium and Carbon contents.

Tin Plates.—The demand continues to improve, especially as far as Bright Plates are concerned. Some slight changes have been made in the readjusting of prices on odd sizes of Bright Plates recently, which do not affect the general market. Prices continue to be held at $3.90, f.o.b. Pittsburgh, and $4.09, f.o.b. New York for 100-lb. IC Coke Plates. The English price is 1½d., lower at 14s. 9d.

Old Metals.—The higher quotations made for Ingot Copper have been responded to by dealers advancing their selling prices on Old Metals, which are quoted as follows:

	Cents.
Copper, Heavy Cut and Crucible	23.75 to 24.75
Copper, Heavy and Wire	23.00 to 24.00
Copper, Light and Bottoms	21.50 to 22.50
Brass, Heavy	16.75 to 17.50
Brass, Light	13.75 to 14.50
Heavy Machine Composition	21.75 to 22.50
Clean Brass Turnings	15.25 to 16.00
Composition Turnings	18.25 to 19.00
Lead, Heavy	6.00
Tea Lead	5.70
Zinc Scrap	5.00

Iron and Industrial Stocks.

NEW YORK, March 13, 1907.

The stock market has passed through great tribulations since our last report. While the market was weak on Thursday, it underwent a period of tremendous liquidation on Friday, which was continued on Saturday, and in a few instances lower prices were made early on Monday, but on that day an improvement set in which was continued on Tuesday. The severity of the drop in prices is shown by the following range of prices on active industrial stocks, the first figures in each case being the highest price prevailing on Thursday and the second figures the lowest price reached either on Saturday or Monday: United States Steel common 42⅝ to 37, preferred 102½ to 99⅜; Car & Foundry common 42¼ to 38¾, preferred 102 to 100½; Locomotive common 71 to 67, preferred 110 to 108¼; Steel Foundries preferred 40½ to 38; Colorado Fuel 41¼ to 36; Pressed Steel common 45½ to 41, preferred 94 to 93; Railway Spring common 52¼ to 47½; Republic common 29¼ to 25, preferred 96 to 93; Sloss-Sheffield common 61 to 57; Tennessee Coal 142½ to 139; Cast Iron Pipe common 42 to 34⅝, preferred 85½ to 82¾; Can preferred 53½ to 51½. Another severe break in prices occurred this morning. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 37½, preferred 99½; Car & Foundry common 37⅜, preferred 100; Locomotive common 65¼, preferred 110; Steel Foundries common 7, preferred 38; Colorado Fuel 32½; Pressed Steel common 39; Railway Spring common 47½; Republic common 25½, preferred 88⅝; Sloss-Sheffield common 53; Tennessee Coal 140; Cast Iron Pipe common 36⅝, preferred 81½; Can common 5¼, preferred 51⅝.

Dividends.—The American Car & Foundry Company has declared a quarterly dividend of 1¾ per cent. on the preferred stock and ½ per cent. on the common stock, both payable April 1.

The American Smelting & Refining Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable April 1, and 1¾ per cent. on the common stock, payable April 15.

The American Can Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable April 1.

J. G. White & Co., Incorporated, has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable April 1.

The Railway Steel Spring Company has declared a semi-annual dividend of 2 per cent. on the common stock, payable April 4.

The Otis Elevator Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable April 15, and a dividend of 3 per cent. on the common stock, payable in two installments, the first in April 15 and the second on October 15.

The Union Switch & Signal Company, Pittsburgh, has declared a quarterly dividend of 3 per cent. each on the preferred and common stock.

The Boston Metal Trades Association.

The annual meeting of the Boston Branch of the National Metal Trades Association was held March 6. The following officers were elected: President, Fred F. Stockwell, Barbour-Stockwell Company, Cambridge; vice-president, Edwin E. Bartlett, Boston; treasurer, A. L. Lovejoy, Becker-Brainard Milling Machine Company, Hyde Park; Executive Committee, for two years, E. P. Robinson, Atlantic Works, East Boston; D. D. Russell, James Russell Boiler Works Company, South Boston; the other members of the board being M. H. Barker, American Tool & Machine Company, Boston, and J. A. Murray, Murray & Tregurtha Company, South Boston. These members were chosen to serve on the District Committee: Chairman, Fred F. Stockwell; vice-chairman, Edwin E. Bartlett; E. P. Robinson, D. D. Russell and A. L. Lovejoy. The Apprentice Committee made a report to the meeting, and after some discussion of the question the committee was requested to consider the matter in detail, consulting with members employing the various trades, and to make another report as soon as convenient.

Iron Ore and Coal Production in Great Britain.—Official statistics just published show that the output of coal in Great Britain from mines under the Coal Mines Regulation act was 251,050,809 tons in 1906, as against 236,111,150 tons in 1905, an increase of 14,939,659 tons. A new record is thus established. An increase of about 24,000 men employed is reported. The total output of iron ore under the Coal Mines Regulation act in 1906 was 8,209,880 tons, against 7,860,969 tons in 1905. The principal contributing districts were as follows: Cleveland, 6,102,223 tons; Staffordshire, 1,025,857 tons; Scotland, 875,358 tons. These figures do not include the production on the West Coast, in Lincolnshire, Warwickshire and one or two other districts. The total iron ore production in 1906 by mines operated under the Metalliferous Mines Regulation act was 1,824,415 tons, against 1,768,279 tons in 1905. The production of manganese ore was 22,762 tons in 1906, against 14,474 tons in 1905.

The Zug Iron & Steel Company, Pittsburgh, has bought 27 acres at Fair Oak Station on the Pittsburgh, Ft. Wayne & Chicago Railroad, 15 miles from Pittsburgh. No definite plans have been made for the development of this property, but it has been bought in case the company should decide to remove its plant from its present location in Pittsburgh, where it is very much cramped for room. The Zug Iron & Steel Company is one of the oldest iron concerns in the Pittsburgh District, making high grade iron bars and sheets.

Practically all of the machinery has been installed in the new plant of the Capitol Lock Nut & Washer Company, Columbus, Ohio. It is turning out over 20 tons daily at present, and when all its machinery is in place its capacity will be from 28 to 30 tons. Besides manufacturing a patent lock nut and washer, the company turns out a great deal of standard stock. It was incorporated about 18 months ago in New Jersey, and was reincorporated in Ohio last May with a capital stock of $750,000. The company is said to have orders representing its output for nearly a year ahead.

The National Department of the National Tube Company at McKeesport, Pa., on March 8 turned out 2427 gross tons of finished pipe. The best previous record for output was 1830 gross tons, in October, 1904. The company's Lorain plant, on February 22, 1907, made 1821 tons. The total output of finished pipe at all the plants of the National Tube Company, on March 8, was 5850 gross tons, this being the world's record.

The General Water Company, Frick Building Annex, Pittsburgh, has placed a contract with the Epping-Carpenter Company, Pittsburgh, for two 3,000,000 gal. pumping engines for installation at Arensburg, Fayette County, Pa.

Ontario's Iron Ores.

TORONTO, March 11, 1907.—The fifteenth annual report of the Ontario Bureau of Mines, covering the operations of the calendar year 1905, is now issued; though late in appearing it is very much in request. The great demand for copies is both a tribute to the usual excellence of the Bureau's publications and an indication of the growth of interest in the Province's mineral resources. Never before were so many people seeking information about the mineral deposits of Ontario. This new awakening of interest in the Province's possible underground riches is largely a result of the wonderful discoveries of silver in the Cobalt region. In part, too, it is a consequence of the steadily increasing commercial demand for iron ore and of the great rise in the price of copper. To railroad enterprise also some part of the credit must be apportioned. The Government's Temiskaming line, the building of the Canadian Northern's line from Toronto through the Parry Land and Muskoka districts toward Sudbury, and the developing influence of the Rainy River section of the same company's transcontinental line are important factors in the situation.

New Ore Fields.

Concerning Ontario's iron fields much has been said in American daily newspapers, especially Western papers. Laid alongside the official information given in the Bureau's report, some of this newspaper matter looks very imaginative. In 1905 there were no sensational "finds" or developments in the iron areas of the Province, and if there had been any in 1906 the public would have heard about them through the Bureau, whose intelligence in respect to such matters is always prompt and reliable. That the Bureau is responsive to the new demand for iron ore is shown by the director's account of the work done during the year. On this point he says:

> Exploring for iron ore goes on steadily from year to year. In addition to the iron ranges or fields mentioned in former reports there is reason to believe that ore bodies of importance will be found west of the township of Hutton, probably continuations of the deposits in the latter place, for which a branch of the Canadian Northern Railway will shortly afford an outlet; also at Woman River, north of the main line of the Canadian Pacific Railway. Iron ranges have also been located near Burwash Lake and Shining Tree Lake in the Tamagami Forest Reserve, but the amount of development work done at these points is insufficient to prove the value or character of the deposits. Prospecting work done in the vicinity of the banded magnetite deposits on the northeastern arm of Lake Temagami are said to have revealed the presence of hematite, but the extent of the bodies has not yet been shown. Samples of hematite of good quality have also been brought from the neighborhood of Flat Rock Rapids, on the Montreal River.
>
> In view of the importance of obtaining all authentic information possible regarding the iron ore resources of the Province, it is proposed to undertake an examination of the iron ore ranges lying east of Lake Nepigon, which have frequently been referred to in the bureau's reports.

Eastern Michipecoten.

To Dr. Coleman, assisted by E. S. Moore, the director assigned the task of further examining the iron ranges of eastern Michipecoten, a work in which Dr. Coleman did good service some years ago. In the account which Dr. Coleman gives of his explanations in 1905 mention is made of the discovery of an iron range of considerable magnitude a mile or two from the Helen mine, within territory supposed to have been carefully covered by prospectors. The range is known to extend 1¾ miles southward, and to be as much as 200 paces wide. A series of claims has been taken up upon it by Alvis Goetz. All the features of the range at the Helen mine seem to be repeated there, though so far no important mass of iron has been found. Near Lake Anjigomi an iron formation of some promise is located. Dr. Coleman speaks of it thus: "The richer parts of the iron formation here seem heavy enough to form ore of fair quality. If any large deposits can be found it will be another instance like that of Hutton township, where the iron formation itself is nearly enough pure magnetite to be workable."

Mr. Moore's examination of the district resulted in the finding of many masses of the Helen iron formation, but most of them he considered to be either too small or too lean in concentrated ores of iron to be of economic importance.

Animikie Iron Range.

Animikie iron range, from Loon Lake to Port Arthur, was explored for the Bureau by L. P. Silver. The section of the range between these two points is about 30 miles long. The history of operations on this range is summarized in the following paragraph from Mr. Silver's report:

> Within the last few years some very systematic work has been done in the region, both in test pitting and diamond drilling, by Rinaldo McConnell of Ottawa, Messrs. Wiley Bros. and Marks, T. Hogan, and Messrs. Flaherty and Knobel of Port Arthur.
>
> The iron ores of the Animikie range consist mainly of hematite and limonite, throughout which may be seen almost unaltered to very much altered lenses of siderite. This siderite is very abundant throughout the ore of every pit and tunnel in the lower iron formation, and may be distinguished by its light color and by its glistening appearance, due to reflection of the light from the cleavage surfaces. Magnetite occurs in small amounts, generally near intrusions, and is clearly a metamorphic product of the hematite. The ore has been concentrated along and near the fault zones, much of it being changed to carbonate. That the deposits in question are still in process of formation may be seen by the presence in the ore of lenses of the comparatively unaltered taconyte and carbonate, which reduce the percentage of the otherwise high iron content of the ore. Unlike the Mesaba and other iron regions south of Lake Superior, the deposits do not occur in pitching troughs, nor do they rest on an impervious basement. This may in part also account for the absence of the pure concentrations of iron ore so common to the south of the lake. The deposits here are, however, concentrations produced by meteoric waters circulating along faults, and the best ore occurs along the best defined faults, becoming leaner at a distance from them, and gradually shading into little altered taconyte.

Analyses of ore taken from five different points in the series shows its iron content to vary from 27.64 per cent. to 40.45, the average being a little more than 33 per cent. It is pointed out that the iron content is really higher than the Bureau's analyses show, as there is a high percentage of carbon dioxide in the ore, an element that will soon be driven off in the furnace. The sulphur present ranges from 0.016 per cent. to 0.09 per cent., the average being not quite 0.07. The average proportion of phosphorus was found to be 0.14 per cent.

That the percentage of iron in the "run of mine" ore can be greatly increased by concentration is shown by some experiments performed by Mr. Knobel of Port Arthur. These demonstrated to the satisfaction of Mr. Knobel that 70 per cent. of the top 10 feet of the ore body will produce a grade of ore averaging 55 per cent. of iron, 0.022 per cent. phosphorus, and 17 per cent. silica, and that 30 per cent. of the ore in that layer must be discarded as waste. There was no sulphur in the ores concentrated by Mr. Knobel.

Atikokan Ore.

The references in the report to the ore of the Atikokan range are interesting on account of the completion of the Port Arthur furnace, for which the raw material is to be drawn from the Atikokan range. Some of these references are here quoted:

> Considerable interest has been manifested in the iron properties near Port Arthur during the last year, especially at the Atikokan range. Mining locations 10 E, 11 E and 12 E have been acquired by the Atikokan Iron Company.
>
> The range in which the ore is found occurs as a steep narrow hill of green schist, interbedded with lenses of magnetite. A tunnel 288 ft. long has been driven completely through the hill, disclosing ore in three separate places, having widths of 44 ft., 10 ft. and 16 ft. respectively, the section being described in the "Eleventh Report of the Bureau of Mines." The ore is a magnetite, partly coarse and partly fine grained. The magnetite in some parts is associated with pyrrhotite to such an extent that the ore must be roasted before smelting.

Ontario's Ore Consumption.

In 1905 Ontario furnaces smelted 445,419 tons of iron ore. Of this total only 61,960 tons came from Ontario mines. The other 383,459 tons were imported from the United States. It is important, therefore, as a question of domestic industry to find suitable ore sources at home.

C. A. C. J.

Four Million Tons of Rails in 1906.

The United States statistics of Bessemer steel ingots and of Bessemer steel rails in 1906 have been collected by General Manager James M. Swank of the American Iron and Steel Association. They show that the total production of Bessemer steel ingots and castings last year was 12,275,253 gross tons, and that the production of Bessemer steel rails was 3,705,642 tons. The statistics of open hearth rail production in 1906 have not been published, but Mr. Swank estimates on figures already in hand that the rails made in 1906 from open hearth steel, rails rolled from purchased blooms, crop ends and "seconds," and rails rerolled or renewed by nonproducers of steel ingots will amount to about 300,000 tons, against 240,200 tons in 1905, making the total rail production in the United States in 1906 about 4,000,000 tons, as against 3,375,929 tons in 1905, an increase of about 20 per cent.

Bessemer Ingots and Castings.

The following table gives the production of Bessemer steel ingots and castings in the last six years. Of the production last year about 32,000 tons was steel castings, against 22,103 tons in 1905.

	Gross tons.		Gross tons.
1901	8,713,302	1904	7,859,140
1902	9,138,363	1905	10,941,375
1903	8,592,829	1906	12,275,253

Below is given by States the production of Bessemer ingots and castings since 1903 in gross tons:

States.	1903.	1904.	1905.	1906.
Pennsylvania	3,909,436	3,464,650	4,491,445	4,826,725
Ohio	2,330,134	2,050,115	3,131,149	3,769,913
Illinois	1,366,569	1,257,190	1,651,250	1,685,056
Other States	986,690	1,087,185	1,667,531	1,993,559
Total	8,592,829	7,859,140	10,941,375	12,275,253

Bessemer Rails.

The production of all kinds of Bessemer steel rails by the makers of Bessemer steel ingots in 1906 was 3,705,642 gross tons, against 3,135,729 tons in 1905, an increase of 569,913 tons. The maximum production of Bessemer steel rails by the makers of Bessemer ingots was reached in 1906. The following table gives the production by States of Bessemer steel rails by the producers of Bessemer steel ingots in the last four years. Included in the figures for 1906 are 144,738 tons of rerolled or renewed rails rolled by companies which manufacture Bessemer ingots. The quantities given are in gross tons:

States.	1903.	1904.	1905.	1906.
Pennsylvania	1,185,191	801,657	1,095,154	1,298,409
Other States	1,688,037	1,283,031	2,040,575	2,407,233
Totals	2,873,228	2,084,688	3,135,729	3,705,642

The following table separates the production of rails weighing 45 lb. and less than 85 lb. to the yard from those weighing less than 45 lb. and over 85 lb. Bessemer rails rolled by companies which do not make Bessemer ingots are not included. The quantities given are in gross tons:

	Under 45 lb.	45 lb. and less than 85.	85 lb. and over.	Total.
Pennsylvania	130,361	548,132	619,916	1,298,409
Other States	92,997	1,060,661	1,253,575	2,407,233
Totals	223,358	1,608,793	1,873,491	3,705,642

In 1906 the United States exported 328,036 tons of steel rails. No iron rails were exported. Imports in 1906 were 4943 tons of iron and steel rails.

The Duluth Steel Works Project.

It is expected that next week the report of a committee will be at hand which was appointed by the United States Steel Corporation to study the question whether it is advisable to build a steel plant at Duluth. It is understood that the indications are favorable, based chiefly upon the fact that coal can be taken cheaply in ore vessels to Duluth to be coked there. The plant would probably include a combination rail and structural mill and some bar mills.

Trade Publications.

Electrical Apparatus.—General Electric Company, Schenectady, N. Y. Bulletins. No. 4467 pertains to the emergency straight air brake system for the combined operation of single cars and short trains. No. 4465 calls attention to three sets of trolley frogs with various divergence angles of tongues and different lengths of pan.

Molding Machines.—Berkshire Mfg. Company, Cleveland, Ohio. Catalogue. Contains an illustrated description of the Berkshire automatic molding machines, which were described in *The Iron Age* June 28, 1906. Castings automatically molded on these machines are shown, and a list of a few users is given. Rotary riddles and aluminum snap flasks are also described and illustrated.

Hoists and Cranes.—Sprague Electric Company, 527 to 531 West Thirty-fourth street, New York. Flyer No. 225. Shows a few of the many combinations of hoists, carriages and cranes built by this company and also a vertical electric winch and electric winding drum hoist.

Gas Producers.—Amsler Engineering Company, Pittsburgh, Pa. Two circulars. These explain the various advantages claimed for the Amsler gas producers. The principal ones are efficiency, low cost in repairs and continuous and economical operation. This producer was described in *The Iron Age* January 5, 1905.

Hydraulic Jacks.—Richard Dudgeon, 24 Columbia street, New York. Circular. Describes the new type of Dudgeon hydraulic jacks, patented in 1906, which embodies as one improvement a double pump, making it possible to raise light loads at twice the speed obtained when using the single pump in raising a load approximating that of the jack's capacity. Special features are the assembling of the valves in one chamber and the reduction of their number, the principal benefit of which is an increased reliability. An illustrated description of this jack appeared in *The Iron Age* January 3, 1907.

Soil Pipes and Fittings.—Central Foundry Company, 116 Nassau street, New York. Catalogue and price-list B. Size, 4 x 6½ in.; pages, 211; cloth binding. An extensive list of the company's manufactures, including all sizes of standard, medium and extra heavy cast iron soil pipe and fittings; plumbers' ironwork, including sinks of all forms; service boxes, valve boxes and miscellaneous castings. The value of the book to the prospective purchaser is greatly enhanced by a complete index.

Supplies and Machinery.—The James Reilly Repair & Supply Company, 229 West street, New York. Catalogue. Size, 5½ x 8½ in.; pages, 506. This catalogue, extensive as it is, is intended merely as an indication of the range of goods handled by this company, and the conduct of its manufacturing, repair and supply business, which was founded in 1867. It embraces practically everything necessary to the plumber and steam fitter, the machinist, founder, general contractor, boiler maker, blacksmith, sheet metal worker, and to a considerable extent the electrician, particularly the one concerned with marine electrical work. Admirably indexed and profusely illustrated, it gives a very good idea of the character of supplies that are for the most part carried in stock, or at least may be obtained on short notice.

Gear Planers.—Gleason Works, Rochester, N. Y. Catalogue. Size, 11½ x 9½ in. Contains descriptions, with illustrations, of the 15-in. generating bevel gear planer described in *The Iron Age* June 21, 1906; automatic gear planers for bevel gears, planers for bevel and spur gears, and planers for spur gears alone. The first generates bevel gears and the second cuts them according to formers which are made for the work, and are guaranteed to be correct. The catalogue is very attractively got up, with more than the usual attention to its artistic composition, the half-tone engravings being on coated paper pasted on fancy paper mounts. The illustrations are large and clear, giving an excellent idea of the construction of the several machines shown, and several pages reproduced from drawings, included at the back of the book, give special details of the mandrels used on the various machines.

Railway Supplies.—General Electric Company, Schenectady, N. Y. Catalogue No. 7601. Size, 8 x 10½ in.; pages, 233; cloth binding. This catalogue has been compiled to give customers information which will enable them to select repair parts for the maintenance of their equipment and lines, and such other supplies as are best suited to their various requirements in the construction and operation of complete electric railway systems. In arranging the subject matter the endeavor has been made to place classes most often required where they will be most readily found, and sufficient descriptive matter is given to enable the customer to readily determine the exact material necessary for his particular needs.

Vertical Engines.—B. F. Sturtevant Company, Hyde Park, Mass. Revised edition of Bulletin No. 125 in the Sturtevant Engineering Series. Describes the line of vertical forced-lubrication inclosed engines which this company manufactures in 18 different sizes, ranging from 5 x 5 in. to 12 x 10 in. A sectional view makes clear the method of positive lubrication.

The Machinery Trade.

NEW YORK, March 13, 1907.

Considerable comment is heard in the trade concerning the small purchases being made by the railroads, many of which are said to be mch in need of additional equipment to take care of their rolling stock, which has been materially increased the past year. Some of the roads are known to be withholding lists, while others have materially scaled down their requirements, both of which are conjectured to be due to the high prices prevailing for machine tools and extended deliveries. It is apparent that the railroads are retrenching to some degree, but could tools be obtained at a lower price it is thought that they would come into the market. It certainly appears as if buyers were holding off and only taking what is absolutely needed at once. This is manifested by the action of the New York Central Railroad, which has had a list of tools prepared for some time, but has not sent it out. Within the past few days it has been making emergency purchases, taking almost any make of tool that could be used to supply its immediate needs. It is apparently awaiting more favorable terms before coming into the market for any large list of machinery. These purchases were not heavy and they tend to the belief that the road will continue to buy from time to time only such tools as it has to have immediately. It is also said that the Delaware, Lackawanna & Western Railroad has decided to curtail purchases. This road, which was preparing a list of tools for its new shop at Scranton, Pa., is understood to have decided to equip a portion of those shops with part of the machinery purchased some months ago for its shops at Kingsland, N. J., which will give it a fair equipment at Scranton. This will leave the equipment of the Kingsland shops still incomplete. During the week the Atchison Railroad purchased a small quantity of machinery. A prominent machinery man in this section is of the belief that the high price of tools is causing industrial companies to delay purchases. Several of these companies have new buildings under way, but have not yet bought the equipment. There is, however, a large volume of business being transacted, and inquiries are numerous, but the latter are slow in closing, and in many cases only a part of the inquiries materialize into orders. The largest order reported for the week covered tools aggregating about $25,000 in value, many of them for delivery next fall.

A report made by Vice-Consul Stadden of Mexico on machinery needs in the Manzanillo District of Mexico is of interest to the trade here, considering the fact that a number of export houses have been making an active campaign in Mexico of late in the interests of American machinery and have been doing considerable buying in the New York District. The Vice-Consul's report suggests that among other things sugar machinery, boilers, engines, sawmills, electric plants and ice machinery are in demand there, and he adds that it would be to the interest of American manufacturers to print some of their catalogues and advertising literature in the Spanish language. He calls attention to the fact that it would be well to pay attention to details in arranging such matters and to see that the literature is put together in proper shape and contains all necessary information regarding the prices for delivery at the points in Mexico where the machinery is needed. He declared that another fault of many catalogues sent from this country is that gross shipping weight and cubic feet are not stated, and this, he says, is necessary to enable the purchaser to calculate what the freight charges would amount to. In conclusion, the report states that there is every chance for the building up of a large trade if the manufacturers of the United States would establish agencies with people in charge who can speak the Spanish language and install machinery. Mexican officials have of late been obtaining information as to where to get machinery of varied descriptions, and American export houses state that there is a decided inclination on the part of Mexicans to establish closer trade relations with this country. A great deal of light and power equipment has been sold in Mexico recently, and American engineering firms have been doing a good business in the way of railroad and power plant construction, and most of the business in the way of machinery equipment purchasing in these cases, of course, has been placed in this country.

An agency has been opened in Mexico City by Manning, Maxwell & Moore, 85 Liberty street, New York, and the machinery trade has been circularized by that company with a view to arranging connections for the Mexican trade. W. B. Reid, who has for some time been acting for Manning, Maxwell & Moore as a traveling representative, is in charge of the company's new branch.

General Electric Company's New Erie Plant.

The General Electric Company, Schenectady, N. Y., has purchased 700 acres of ground at Erie, Pa., extending from the Lake Shore Railroad to the lake front, 300 acres of which will be reserved for a new plant, the other 400 acres to be used for houses for the men. It is the intention to construct a large plant on the property, and some of the buildings will be erected this summer. Plans have not yet been prepared, but they will cover a large foundry and one or two other structures, which will be the first portion to be built. When these are completed it is expected that other shops will be erected, the intention being to use these buildings as a nucleus for an extensive plant. The company will not move or dismantle any of its present works, but will build the new plant to take care of increased business, which is taxing its present shop facilities.

Inquiries now before the trade indicate that the American Car & Foundry Company is preparing to buy equipment for the tank shop, to be erected in connection with its plant at Milton, Pa. The company proposes to build a steel frame structure covered with corrugated iron, and it will be 74 x 560 ft. A power plant will be erected in connection with the tank shop and engines, and boilers and generators capable of producing about 450 hp. will be purchased. While the details for the erection of the plant have been in a measure arranged at the company's offices at 25 Broad street, New York, T. R. Brown, the company's inspector of tools and machinery at Milton, will have charge of the selection of the mechanical equipment. From all accounts no very large orders, if any, have been placed as yet for machinery, and the equipment of the plant will necessitate a large expenditure.

In April the Standard Roller Bearing Company, Philadelphia, Pa., will secure possession of the property of the Pennsylvania Iron Works, which it purchased some time ago and which it will remodel, spending nearly $100,000 in the work, including the changing of the buildings from one-story erecting shops to two and three story factory buildings. As soon as the company takes possession of the works it will equip it with a full line of machine tools, a large portion of which it has already purchased. At present the company is in the market for a number of lathes, drills, boring machines, planers, shapers and Brown & Sharpe grinders.

Riveting machines, rollers, &c., for punching and riveting ¾-in. cold steel, to be motor driven, are required by the Haynes-Langdenberg Mfg. Company, St. Louis, Mo., which is building a new plant for the manufacture of Front Rank steel furnaces. About $40,000 will be expended in constructing the plant.

The Middleville Electric Light Company, Middleville, N. Y., is making some additions to its plant, and the requirements include a 75-kw. dynamo, for which inquiries are in the trade. The purchasing is being done by H. B. Sweet, who has offices in the Clarenden Building, Utica, N. Y.

Bids will be received on March 18 by the Department of Public Charities, City of New York, with offices at the foot of East Twenty-sixth street, for furnishing two new boilers in the power house of the Kings County Hospital. The amount of surety required is $7000.

Detailed plans for both the Lexington and Seventh avenue subways are being prepared, and it is understood that the Rapid Transit Commission will advertise for bids for the construction of both subways at the same time.

Equipment for a small brass plant for export to Germany is being purchased by Louis R. Magee, 25 Broad street, New York. The plant is intended for the largest electrical company of Berlin, Germany, and it will be capable of handling about 10 tons of material a day. The equipment will include, among other things, shears, dipping machinery, polishing machinery and everything that goes to make up a first-class equipment for a plant of that size.

Owing to the increased cost of production, the McCrum-Howell Company, New York, has withdrawn prices on its Uniontown radiators for steam and hot water. New discounts on the company's entire line of radiation are being prepared and will be issued as soon as possible.

Quite a number of firms connected with the machinery and metal trades have engaged quarters in the new West Street Building, between Cedar and Albany streets. Among the companies who have recently arranged to open offices in the new building are the International Brake Shoe Company; George B. Spearin, contractor; Royden Model Machinery Company; Barton & Carpenter, electrical engineers; National Electric Lamp Company; National Metal Company; Wheeler Condenser & Engineering Company; C. Von Goeben & Engel, engineers; H. Sanders, engineer; James B. Tonking, consulting engineer; Green Fuel Economizer Company; John A. Caldwell, engineer; Bacon Air Lift Company; George V. Cresson Company, machinery; Henry A. Hitner's Sons Company, iron; Parker Boiler Company; Alfred H. Schutte, export machinery; Walter Kidde, engineer; L. J. Wing Mfg. Company, machinery; Leber & Sons, machinery.

Philadelphia Machinery Market.

PHILADELPHIA, PA., March 12, 1907.

Conditions in the local machinery market are practically unchanged. Buying continues fairly active, and while no sales of any particular moment were made the past week the aggregate business was generally satisfactory to the trade. Single tool orders predominate, although there were some sales of small lots. Several large propositions are under consideration, and one of these in particular is expected to be closed at an early date. No orders have been placed, as far as can be learned in the local trade, against the recent specifications of the Baltimore & Ohio Railroad, although it is expected that that business might develop almost any day. The railroads in this vicinity are inclined to hold up new business, and it is said that some of the leading roads will not consider any new propositions until those on which they are now working are completed. The same policy is to be carried out, it is said, by several of the large industrial concerns in this territory. Inquiries continue to be received in good number for all classes of tools, and owing to the general shopping around for best deliveries the volume of apparent business is in some cases greater than the actual demand.

Manufacturers are still booking a comparatively large amount of business, the greater portion of which has been of the single tool variety. Special tools have been in fairly good demand, but tool builders are not particularly anxious to take on this class of business when there is a good market for the regular lines. Deliveries are hard enough to meet on standard goods, and, with the continued difficulty in obtaining raw materials of almost every class manufacturers in many cases refuse to take orders for special tools on definite delivery dates.

There has been a little more activity in the foreign trade. Some fair sized equipment, mostly small tools, however, has been sold for export during the past week. Specialties usually associated with the machine tool and power transmission lines continue in good demand and in some cases manufacturers report an increased number of orders. The inability to make prompt shipments of both machinery and tools, however, has a retarding effect on the export business in those lines.

The second-hand machinery market continues very active, and buyers in many cases look that field over pretty carefully before placing orders for new tools which can be had only on long delivery dates. Some classes of tools can be had pretty freely, while others are almost as scarce as new tools for early delivery. Many of the machine tool merchants have entered this field recently and are frequently able to supply tools to customers which have been taken in exchange and which were formerly almost entirely turned over to the second-hand merchant.

The demand for boilers and engines, particularly those of the higher capacities, continues fairly active, while that for second-hand boilers and engines, more especially those of the medium and smaller horsepowers, is somewhat light. More activity is expected in these trades when the weather becomes more open.

The activity in the foundry trades is almost unprecedented. Gray iron foundries are unable to handle the tonnage offered, and in many cases would be unable to get prompt supplies of raw materials, if they could. As it is, the delay from the shortage of pig iron is quite marked, and a number of plants have been forced to close down temporarily at times for the lack of iron suitable for their mixtures. Foreign irons, however, are helping this situation to a considerable extent. Steel casting plants are fully occupied, and as a rule have a tremendous business ahead. Prompt deliveries are almost impossible, and manufacturers are considerably handicapped by the delays experienced in obtaining castings of all kinds.

The Keystone Motor Car Company has let a contract for the erection of a new steel and concrete garage at 216-220 North Broad street. The building will measure 53 x 200 ft., and will contain every modern convenience. A machine shop to facilitate repair work will be included, for which we are advised the equipment has not yet been purchased.

The American Concrete & Steel Company, Newark, N. J., is working on plans and specifications for the erection of a large power house to be built at Twelfth street and Washington avenue for the Philadelphia Electric Company, mention of which has previously been made. It is understood that the plans will be ready for estimate at an early date.

The Department of Supplies, City of Philadelphia, will receive proposals until noon March 18, for supplies to be delivered during April, May and June, included among which are a wire stitching machine, fire main stops, a pipe cutting machine and hydraulic jacks. Specifications regarding these may be obtained from the director, Robert Grier, room 312, City Hall.

The Gray Iron Foundry Company, Reading, Pa., is engaged in making an addition to its foundry which will give it a molding floor 60 x 100 ft. The new building is to be of concrete and sheet iron. The increased facilities will enable this concern to increase its capacity about 5 tons per day, the work being confined entirely to castings of the lighter class. On completion of the foundry a rearrangement of the machine shop will be made, and about midsummer it will be in the market for additional tools, among which will be included a milling machine, planer, shaper and a thread cutting machine.

The Abrasive Material Company will build an addition, 60 x 45 ft., at its plant at Seventy-first and Upland streets. This addition will be used as a turning department, and when completed will enable the company to make a general rearrangement of its grinding and drying rooms so as to increase its productive capacity. The various improvements involve no important purchases of machinery.

The Espen-Lucas Machine Works notes a particular demand recently for heavy motor driven cold saw cutting off machines of all types, as well as for special slab milling machines and horizontal floor boring, milling and drilling machines. Orders are being received in good numbers, and the plant is being operated to its full capacity. Recent deliveries include shipments of crank shaft, structural, bar and steel foundry saws to customers in New England, the Middle West and in the local territory.

The Royersford Foundry & Machine Company, Royersford, Pa., has had a very good demand for its line of punches and shears, as well as for power transmission machinery. Every department of the plant is fully occupied. Some recent deliveries by this concern include a No. 2 punch and shear to the Bagwell & Gower Mfg. Company, Gainesville, Ga.; a No. 3 to Brooklyn, N. Y., parties, and a No. 3 has been delivered to the Baldwin Steel Company, Charleston, W. Va.

The Baldwin Locomotive Works is being operated at its full capacity and has orders on its books to keep it actively engaged for many months ahead. Most of the business coming in at this time is confined to small lots and single engines, there being but little inquiry for large lots from the railroads at the present time. Work is being pushed forward as rapidly as possible at its Eddystone plant, and the foundry at that place is now producing nearly two-thirds of the gray iron castings required by the Baldwin Works. Shipments made recently include 10 locomotives for the Central Brazil Railroad, of which six were consolidation engines and four were 10-wheel locomotives. Of the former, two were equipped with the German or Schmitt type, two with the Vaughn type and two with the Vauclain type of superheaters, which will be tried out on that road. Twenty engines have also been shipped the Atlantic Coast Line, and a number delivered the Missouri Pacific, Great Northern and Rock Island roads on account of orders placed. A number of locomotives have also been recently furnished industrial and mining concerns in different parts of the country.

F. J. Boas, 14 South Broad street, has been awarded the contract for the construction of the new plant of the Standard Cast Iron Pipe & Foundry Company, at Bristol, Pa. The buildings will be of brick and steel construction. There will be two main foundry buildings, each 101 x 549 ft.; loam foundry, 129 x 189 ft.; cleaning, storage and shipping building, 52 x 220 ft.; machine shop, 83 x 203 ft.; power house, 50 x 150 ft.; pattern shop and pattern storage, each 53 x 129 ft.; blacksmith shop, 32 x 62 ft.; office building, 50 ft. square, and three smaller buildings. The work on these buildings, of which the estimated cost is $400,000, will be commenced at once. It is also understood that the major portion of the crane equipment for the plant has been contracted for, but that the power equipment and machine tool propositions are still unclosed.

Chicago Machinery Market.

CHICAGO, ILL., March 12, 1907.

There is perhaps no other manufacturing industry in the country that has been more substantially benefited by the present era of industrial activity than has that of machinery. Extending through all lines, though gathering impetus slowly at first, trade has expanded in every direction until there is no department in the wide range of machinery equipment that is now without a full, and in many instances overflowing volume of business. Measured by the unabated demand that still exists for machine tools it is evident that no halting movement has yet appeared in the continued increase that has for many months been going on in all kinds of manufacturing plants. Until the limits of consumptive absorption have been reached it is plain that no reaction need be feared. But little, if any, improvement is apparent in deliveries, and in some classes of tools dates of shipment have been still further extended. Lathes, planers and shapers are not easily obtainable for prompt delivery, and stocks on "Machinery Row" are stripped of all desirable

tools; one of the principal houses could show but a single new lathe on the floor. Second-hand tools continue in good demand, though there is a great scarcity of anything in this line that would under normal conditions be at all salable. In a recent auction sale, held by the receiver of a safe manufacturing plant in Cincinnati, the entire tool equipment was offered, and, all things considered, brought remarkably high prices. It is reported that approximately $15,000 was realized upon this sale, and in view of the fact that but a small portion of the tools were at all modern, a large part of them being 20 and 25 years old, it fully demonstrates present shop necessities, which compel the use of all available means for increasing their output. Heavy machinery, such as punches, shears, rolls and other tools, for boiler shop and structural fabricating are in especially good demand, most consignments going to replace worn out or inadequate tools in existing plants. An unusual local demand for trip hammers suitable for use in blacksmith and wagon shops has been created by the adoption of a wide tire ordinance in the city of Chicago, which requires the use of tire steel, too heavy for hand welding, on heavy teaming trucks. Tires 1 x 6 in. must be used, and as a result many shops are compelled to buy additional equipment in order to handle this work.

Work will shortly be begun on a new 12-stall roundhouse of iron and stone construction by the Southern Pacific Railroad at Santa Barbara, Cal. A machine shop 40 x 60 ft. will be built in connection therewith, and will be equipped with modern tools and appliances.

The Henderson City Railway, Henderson, Ky., which at at a receiver's sale, February 18, was brought by the bondholders, has been reorganized under the name of the Henderson Traction Company. The officers of the new company are Henry P. Barrett, president; Charles E. Dallam, secretary and treasurer; K. R. Battin, superintendent. It is the purpose of the new company to improve the property, and it is now in the market for a 250-hp. boiler and a 125-kw. generator, which will be installed in the power plant. The lines of the company will be extended within the city limits, which together with some changes in existing lines will total a trackage of about 2 miles.

The Independent Pneumatic Tool Company, Chicago, has been awarded a large contract for Thor piston air drills and pneumatic hammers by the Wisconsin Engine Company, Corliss, Wis.

The Martin Grate Company, Chicago, recently closed a contract with the Panama Canal Commission for 48 sets of its patent rocking grates.

The Chicago office of the American Steam Gauge & Valve Mfg. Company, Boston, Mass., which has been located for the past 20 years at 16 North Canal street, has been removed to new and commodious quarters at 7-9 South Jefferson street, where, with increased floor space, the company will be able to carry a much larger stock of its staple goods and specialties than ever before. A large assortment of gauges of every description and a complete line of brass pop safety valves, water relief valves and indicators will be carried in stock at all times. Owing to the increased business of the company it was compelled to move into larger quarters, and at the new location will be able to supply the trade in a very satisfactory manner.

New England Machinery Market.

WORCESTER, MASS., March 12, 1907.

The demand for machine tools seems to have steadied down, to use the words of a prominent Boston dealer. Buying is constant, with no decrease in volume, but with little of the sensational in the way of large business. A few good lots have been figured in the past fortnight, but these lists do not seem to have been generally distributed in the trade. Deliveries remain about the same. There has been some improvement in a few isolated instances of drills, and these appear to be the only exception to the rule.

Complaints of congestion of freight continue unabated. The docks are actually overwhelmed with goods, and this has proved a serious annoyance to some of the steel houses, who have been unable to get imported materials for which customers are clamoring. So great is this rush that horses for hauling are at a premium, the tremendous rush of business, coupled with the rough condition of streets, cut up with accumulations of ice, having exhausted many animals, so that they have to be worked with caution. The railroads are in bad shape all through New England and shipments are slow, accentuating the condition of deliveries by keeping machinery on the road long beyond the normal time.

The report of the Connecticut Bureau of Labor Statistics contains some interesting figures regarding the growth of the machine shops of the State, comparing the business of 1906 with that of 1904. The manufacturers included, 120 in number, did a gross business, reckoned in total value of products, of $17,505,000 in 1906, as compared to $14,746,000 in 1904, an increase of 18.7 per cent. The number of men employed increased from 10,787 to 12,004, or 11 per cent., while the total payroll advanced from $6,228,000 to $7,300,000, which is 17.2 per cent. It will be noted that the total of wages increased much more rapidly than the number of employees, the average wage growing from $578 to $608. The larger shops showed a much greater gain on the average. The 38 companies doing a business of more than $100,000 in 1906 showed an average increase of 44 per cent., and this includes several concerns which netted a loss in that period. The comparison is based entirely upon gross production reckoned in dollars, and consequently a part of it is attributable to increase in cost of raw materials.

Proposed improvements in railroad repair shop facilities in New England will aggregate a large expenditure of money for machinery. The New York Central, the Boston & Maine and the Vermont Central have definite plans in mind for the immediate future, which are important as future factors in the machinery market. The New York Central proposes to expend $250,000 in extending its repair shops at West Springfield, Mass., for its Boston & Albany division. The announcement is made with that of general improvements in this branch of the system, including new rolling stock and extending the four-tracking over additional sections of the line. No details are given out as to the repair shop question, and probably plans have not extended beyond a tentative point. The system is badly handicapped by lack of rolling stock and congestion of the line, because there is not enough of the four-track sections. With the large improvements in these respects additional repair shops will be necessary, and they will be constructed as a part of the central shops at West Springfield.

The Central Vermont Railroad has under consideration the establishment of repair shops at the New London end of its system. Engineers are making surveys and plans will be drawn directly. The company now has to send all of its locomotives to St. Albans for repairs, which causes much inconvenience and delay.

The Boston & Maine Railroad is said to be progressing satisfactorily with its plans for large shops at Somerville, Mass., and it is expected in the trade that something like a definite announcement will be made within the next few weeks, which would seem to be necessary if the work is to begin in the spring, as has been the plan.

The Estate of R. B. Little, Providence, R. I., of which F. D. Simmons, 63 Washington street, is executor, is contemplating the erection of a five-story concrete building, about 90 x 130 ft., at Point and Eddy streets, which will be rented for manufacturing purposes. Mr. Simmons states that he has already received application for floor space from jewelry and automobile manufacturers.

The Canadian Billings & Spencer Company, which will build a plant at Welland, Ont., will immediately take up the matter of the purchase of tools for its machine shop. F. C. Billings, Billings & Spencer Company, Hartford, Conn., has the matter in charge. The shop will be equipped for the manufacture of dies, an important department in a drop forging establishment. The lists include lathes, planers, drills, &c. It is not the plan to manufacture finished products for the present, though later, when the demand shall require, lines of the Hartford works will be taken on.

The daily press has contained of late numerous reports of new factory construction for the Pope Mfg. Company, Hartford, Conn., in connection with its automobile business. New plants have been thus located in various parts of the country, and large extensions built at existing factories. Officials of the company state that no new plants have even been considered and no new construction of any moment is contemplated. The policy of the company is, as it has been, one of concentration of its works rather than expansion.

The Henry & Wright Mfg. Company, Hartford, Conn., manufacturer of drilling machines, is making preliminary plans for the building of an entirely new plant, but with no definite purpose as to when the idea will be carried into effect. The present shops on Sheldon street have reached the limits of available space in the building which they occupy. The business has grown with exceeding rapidity, and extension after extension has been made, until it has become necessary to either build an addition to the present building or else establish entirely new works, designed especially for the work. Perhaps the new plant will be built this season, perhaps not until next year. The building will be laid out with the idea of having all heavy tools on the ground floor. Very likely it will be a high studded, one-story building, with monitor roof, and designed so that galleries may be used when the need of the additional space shall require it. The suburbs of Hartford afford many desirable sites for such a shop.

The Baird Machine Company, Oakville, Conn., manufacturer of forming and pointing machinery, tumbling barrels and special machinery, will build another addition to its works in the spring, extending the new shop building 100 ft.

The Turner Tanning Machinery Company, Peabody, Mass., manufacturer of hide and leather working machinery, will rebuild the brass and iron foundry building which was

destroyed by fire recently. Much of the equipment was rendered valueless in the fire and will have to be replaced. Neighboring foundrymen are supplying the company with castings until it is in a position to resume this department of its works.

The New Departure Mfg. Company, Bristol, Conn., manufacturer of automobile, bicycle and other metal specialties, will build a three-story brick factory, of mill construction, 50 x 160 ft., with one-story annex for engine plant, &c.

The new plant of the Bailey Automobile Company, Springfield, Mass., will be 100 x 150 ft., and two stories. The company will be in the market later for machine tool equipment.

The Ashton Valve Company, 271 Franklin street, Boston, is to build a plant at Cambridge, Mass., which will permit of a large increase of manufacturing capacity. The new building will be 60 x 200 ft., and five stories. No decision has been reached as to what power equipment will be purchased. The machinery of the present works will constitute a large part of the initial equipment of the new shops, and no great amount of new tools will be purchased. The main office will be retained at the present location.

The Stratton Rotating Engine Company, which recently purchased the Putnam shop building on Walnut street, Fitchburg, Mass., for the manufacture of a new type of steam engine, has purchased some new machinery and states that it will be in the market for a complete shop equipment to give a substantial manufacturing capacity. The company has already begun to build its engine.

The Locomobile Company of America, Bridgeport, Conn., is making plans for a large addition to its works.

Word comes from Beverly, Mass., that the Beverly Foundry & Machine Company of that place is to build new machine shop and foundry buildings, 50 x 90 ft. and 60 x 100 ft. Official verification of the report has not been obtained.

Another report current in the machinery market is that the C. G. Sargent's Sons Company, Graniteville, Mass., manufacturer of woolen machinery, is to make large additions to the capacity of its works.

The Warren Steam Pump Company, Warren, Mass. is in the market for two four-head motor driven planers, 36 and 60 in.

George H. Dyer, formerly agent of the George W. Stafford Company, Readville, Mass., manufacturer of textile machinery, has been elected treasurer of the Fitchburg Machine Works, Fitchburg, Mass., succeeding H. F. Allen.

The Brien Heating Company, Hoosick Falls, N. Y., has completed arrangements for moving its plant to Westfield, Mass., where it will occupy the building on the Westfield River formerly used by the Crowson Cotton Waste Company. The company manufactures heating specialties.

The builders of presses get a broad view of industrial conditions in numerous branches, including lines which have little connection with the metal trades. They report a strong volume of orders, showing on the average no diminution in the business of their customers. Another trade barometer is the steam pump industry, which indicates from its volume of business in hand and inquiries received of late a most satisfactory outlook everywhere.

The Waterbury Castings Company has been organized at Waterbury, Conn., and will erect new works, for which a complete equipment will be required. The company has a capital stock of $100,000, and its incorporators are John Booth Burrall of the American Ring Company, J. Richard Smith, and Louis N. Perrault, recently with the Manufacturers' Foundry, Waterbury. Organization has not yet been completed by the election of officers. A foundry will be erected, 110 x 250 ft., comprising a main bay 50 ft. wide and two 30-ft. side bays. The main bay will be served by a 10-ton electric traveling crane and two 3-ton wall traveling jib cranes. One of the side bays will be used for power house, flask shop, cupola room and coreroom, and the other for side floor and bench molding. The capacity of the foundry will be 20 tons of high grade castings a day. The company states that it will be in the market for the entire equipment, including cupolas, cranes, power and tools. All communications should be addressed to L. N. Perrault, 47 Prospect street, Waterbury. Mr. Perrault, who will be the manager of the business, is well known in foundry circles throughout New England and also in Canada, and recently has specialized on high grade automobile castings.

Bridgeport, Conn., is becoming a very important center of the marine combustion engine industry. At the present time the Wolverine Motor Works, Grand Rapids, Mich., is building a plant in Bridgeport to be operated in connection with the Michigan works. It is understood that the Van Auken Motor & Machine Works, Yonkers, N. Y., is planning to establish its business in the Connecticut city. The Automatic Machine Company, Royal Equipment Company and the Bridgeport Motor Company, Incorporated, have already established themselves as important and growing industries. This affords another instance of the tendency of lines of manufacture to group together in a community, building up a specialized trade for its workmen.

The Fairfield Aluminum Foundry Corporation, Southport, Conn., has purchased land in Fairfield, Conn., and will erect on the premises a foundry building, 30 x 100 ft., for the manufacture of high grade aluminum castings. The building will be of concrete blocks. An up to date, entirely new equipment will be installed.

The business of the Berkshire Automobile Company, Pittsfield, Mass., will be reorganized. A new company will be formed, with New York capital behind it, under the name of the Berkshire Motor Car Company, which will take over the entire business, including the equipment. The business will be conducted on a larger scale, and the company states that later it will be in the market for additional machine tool equipment. More room has already been secured in the Whittlesey Building.

The Turner & Seymour Mfg. Company, Torrington, Conn., manufacturer of brass and other metal goods, is contemplating important additions to its works. A new one-story building, 40 x 73 ft., will be erected immediately for use as a plating room; a wood storage building, 50 x 200 ft., is planned, and it is expected that an additional story will be put on one of the present brick buildings, to give additional space, 40 x 112 ft. Other new buildings are in contemplation, but have not yet taken definite shape.

The General Electric Company is to erect a new one-story building, 80 x 80 ft., at its Pittsfield works. Report has it that another and much larger manufacturing building is planned for the immediate future.

Cincinnati Industrial Notes.

CINCINNATI, OHIO, March 12, 1907.

The annual meeting of the Cincinnati branch of the National Metal Trades Association was held at the Hotel Sinton on last Thursday evening. The report of Assistant Secretary Manley was replete with information as to the status of the organization here. Mr. Manley, in the course of his remarks, said:

"March 1 witnessed the close of a year of unprecedented prosperity for the association, as well as for the individual firms comprising its membership. The volume of business of any preceding year was surpassed by an estimated average of 20 per cent. This branch of the National Metal Trades Association has kept pace with the procession and of the machine shops in Cincinnati 69 now hold memberships in this organization. On August 11 of last year the Entertainment Committee had charge of what proved to be the greatest outing ever given in any city in the country, the attendance on this occasion being over 26,000."

Following the line of co-operative education, the report says: "What we need to-day is workmen who are able and willing to go into the factory and do a day's work, and we are of the opinion that a school should be maintained in this city where young men with or without technical education can be trained quickly to do with their hands such work as is required in our factories. In this connection it is fair to state that this branch of the National Metal Trades Association assumes a share of the credit for the plans of co-operative education, which has been adopted by the University of Cincinnati in connection with our factories, there being now 30 students taking this course, which makes an average of 20 boys working all the year in our factories with over 100 applications now on file from young men who desire to enter upon this course next year."

The election of officers to serve for the ensuing year resulted as follows: President, S. P. Egan of the J. A. Fay & Egan Company; vice-president, John W. Neill of the J. H. McGowan Company; secretary, E. H. Hargrave of the Cincinnati Tool Company; treasurer, E. N. Chace of the Cincinnati Milling Machine Company. Executive Committee: Geo. Langen of the Cincinnati Planer Company, Isadore Rauh of the Cincinnati Electric Tool Company, Henry Ritter of the Lunkenheimer Company.

Resolutions were passed on the death of Harry C. Hoefinghoff, who was a very active and energetic member of the association. Arrangements were made for attending the annual convention to be held at Boston on March 21 and 22. After the business of the evening the members adjourned to the banquet hall, where a sumptuous spread was prepared. The meeting was attended by most of the machine tool builders of the city and vicinity.

The Lodge & Shipley Machine Tool Company has let contracts for an extension to its main building of 198 ft. This will be of similar construction as the present building, which is of brick and steel, with wood floor laid on cinders and concrete. This will give a total length of shop No. 1 645 ft., with room to extend 355 ft. more. A new three-way electric crane is being erected, and the first unit of a permanent power plant is being installed in the center of the

grounds. The present power plant will in course of time be abandoned and consolidated at the one point. These changes, with the 65 new machine tools recently purchased, it is anticipated will greatly increase the output of the present plant.

The John Steptoe Shaper Company advises that the capacity of the plant was increased during the past year over 50 per cent. Sufficient orders are booked to carry it ahead for the next eight months, a portion of which comes from Japan. Two triple geared 28-in. shapers were forwarded to Italy for Government use, one 24-in. for the Russian Government, and one to Cavite, Philippine Islands, for the United States Government. The large percentage, however, of the trade appears to be from domestic sources and comes from all sections of the country.

Mention was made in these columns some days since that a delegation of Cincinnati representative business men had left for an inspection of the Panama Canal. William Lodge of the Lodge & Shipley Machine Tool Company, who was one of the number, will return on the 14th inst., and will state his impressions of the gigantic undertaking at a banquet given in his honor by the Industrial Bureau on next Monday evening.

The Kern Machine Tool Company, whose plant is located on Spring Grove avenue at the Winton Place station of the Baltimore & Ohio Railroad, is now practically installed in its new shop, 50 x 120 ft., producing the Streit patent pulley lathes in five sizes, from 20 to 50 in., and one size of the Streit boring machine, 36 in., together with the large line of Wright drills formerly manufactured by the American Tool Works Company, ranging in sizes from 20 to 42 in. At present the company will not build these drills below the 25-in. size, owing to lack of shop room. Negotiations are now in progress for the erection of another shop adjoining the rear of present plant, 50 x 120 ft. The company is at present giving employment to a force of 35 men, which will be doubled as soon as the new addition has been completed.

The Wood Turret Lathe Company, recently incorporated to manufacture Wood turret lathes at Terre Haute, Ind., will start operations about April 1, having secured possession of the old Crown Machine Works building, which is now being remodeled and put in shape to install the new machinery. The company will employ about 30 hands at first.

Plans are now being drawn by the Ralston Steel Car Company, Columbus, Ohio, for a new office building, to be located at the present works in East Columbus. The office, now located in the new First National Bank Building, will be abandoned as soon as the new structure is ready for occupancy, and with the opening of spring several additional buildings will be erected at the plant, which at present is entirely inadequate in some of its departments, despite the fact that the works in general were greatly enlarged during the past year.

The Linton Rolling Mill Company, with works at Linton, Ind., and general office at Terre Haute, started up its new plant March 1 with the entire equipment operating very satisfactorily. On March 4 two shifts of 250 men were employed 12 hr. each, with the expectation of producing about 200 tons per day. The company now has orders on its books to run the mill for several months ahead, and with excellent prospects of securing a good many large orders. It will at once erect a number of spike machines and is figuring on putting in a 10-in. mill.

The W. E. Caldwell Company, Louisville, Ky., making a specialty of water works systems, tanks, towers and tubs, has recently completed arrangements whereby it will add the manufacture of the Caldwell friction clutch pulley under the Oesterlein patents, which will be produced in its elevating, conveying and power transmission machinery department.

The City Council, Athens, Ohio, has appropriated $6000 for equipment for the municipal lighting plant, and is in the market for a generator, engine and regulator, for which orders will be placed about April 1. A. R. Bell is superintendent.

The Ohio Foundry Company and the Sterling Electric Motor Company, Dayton, Ohio, both of which are owned by the same parties, and which are located in the same plant at State and Wayne streets, are to move to a new location bounded by Clinton street, the Miami Canal, Second street and the alley, where 2½ acres of ground have been purchased. The buildings to be erected will include a machine shop, 110 x 168 ft., of brick construction, with saw tooth roof, part to be two stories, which will be occupied by the motor department, winding rooms, engineers' offices, etc.; foundry, 140 x 260 ft., of brick, part two stories, and provided with carpenter shop and pattern room. The Ohio Sterling Railroad Company has been incorporated to build a switch over the canal from the Cincinnati, Hamilton & Dayton Railroad through the full length of the new plant. The directors of the Ohio Foundry Company are J. A. Gauthier, Joseph F. Wistendorf, Joseph W. Merkle, Charles Krebs and John A. Wessalosky. The officers and directors

CONTENTS.

	PAGE.
The Providence Gas Engines and Producers. Illustrated	813
Electrolytic Corrosion of Iron and Steel in Concrete	816
The Engineering Societies Building	816
An Improved Buffalo Compressed Air Forge. Illustrated	817
Industrial Hygiene	817
Smoke Inspection at St. Louis	817
Modern Equipment in Old Plants. Illustrated	818
High Speed Tool Steel	822
Naval Construction Plans	824
The Bush Model Factories. Illustrated	825
The Rusting of Iron	825
Chilled Cast Iron Car Wheels	826
A German Two-Step Drawing Press. Illustrated	828
Shop Heating	829
The Metric System	830
The Railway Steel Spring Company's Report	831
The Richmond Foundry & Mfg. Company	831
The Paradox Adjustable Reamers. Illustrated	832
A Rateau Steam Regenerator Installation	832
The Increase in Railroad Mileage and Equipment	833
A New System of Automatic Railroad Signaling	833
Editorial:	
The Future of Railroad Buying	834
The Centers of Pig Iron Production and of Lake Ore Consumption	835
The Connecticut Brass Industry	836
Correspondence	837
The Philadelphia Foundrymen's Association	837
The Trademark Law Amended	838
The American Galvanizing Company	838
Pans for Internal Revenue and Customs Inquiries	839
An Electric Steel Plant in Canada	839
Correction	839
Recent Customs Decisions	840
The Boston Metal Trades Association	840
Labor Notes	840
Personal	841
Obituary	841
Explosion of a Cast Iron Water Brake	841
Pig Iron Production Increasing	842
News of the Works:	
Iron and Steel	843
General Machinery	843
Power Plant Equipment	843
Foundries	844
Bridges and Buildings	844
Fires	844
Hardware	844
Miscellaneous	844
The National Metal Trades Convention	845
The Mechanical Engineers	845
The Iron and Metal Trades:	
A Comparison of Prices	846
Chicago	846
Philadelphia	848
Birmingham	849
Cincinnati	849
Cleveland	850
Pittsburgh	851
Manganese-Zinc	852
New York	853
Metal Market	853
Iron and Industrial Stocks	854
The Boston Metal Trades Association	854
Ontario's Iron Ores	855
Four Million Tons of Rails in 1906	856
The Duluth Steel Works Project	856
Trade Publications	856
The Machinery Trade:	
New York Machinery Market	857
Philadelphia Machinery Market	858
Chicago Machinery Market	858
New England Machinery Market	859
Cincinnati Industrial Notes	860
Government Purchases	862
Hardware:	
Condition of Trade	864
Notes on Prices	864
Trade Items	866
National Freight Service Association	867
Charles Morrill's Trademark	867
Richards & Conover's Fiftieth Anniversary	867
Salesman's Postal. Illustrated	867
Lunkenheimer Company's Eastern Branch. Illustrated	868
Among the Hardware Trade	869
Death of Andrew W. Milligan. Portrait	870
Requests for Catalogues, &c	870
Window Advertising. Illustrated	871
Consular Service and Our Export Trade	872
Price-Lists, Circulars, &c	874
Death of John A. Markley	874
Correspondence	875
New York and New Jersey Hardware and Iron Association	876
Wells Bros. Company's Catalogue	876
Butler Brothers' Minneapolis House	877
Jack Frost Freezer. Illustrated	877
Marvel Rod Cutter. Illustrated	877
McArthur Portable Fire Escape. Illustrated	877
Invisible Roll Wire Screen. Illustrated	878
Current Hardware Prices	880

of the Sterling Electric Motor Company are J. A. Gauthier, president; Ivar Rennerfelt, vice-president, and Joseph F. Westendorf, secretary and treasurer.

Government Purchases.

WASHINGTON, D. C., March 12, 1907.

The Isthmian Canal Commission will receive bids until March 26 for the following machine tools: Class 1, one pipe threading and cutting machine, to take pipe from 1¼ to 6 in.; class 2, one 2-in. double head bolt cutter; class 3, one horizontal boring machine; class 4, one universal cutter and tool grinder; class 5, one 12-in. floor grinder; class 6, two 26-in. sliding head drill presses; class 7, one 5-ft. universal radial drill; class 8, two 18 in. by 8 ft. screw cutting engine lathes; class 9, one 24 in. by 10 ft. screw cutting engine lathe; class 10, one 2 x 26 in. turret lathe; class 11, one 14-in. toolroom engine lathe, with 8-ft. bed; class 13, one rotary splitting shear, to shear ½-in. plate; class 14, four duplex lever punches; class 15, one double punch and shear, to punch ⅞ in. hole in ⅞-in. plate and to shear ⅞-in. flat bar and 1½-in. square or round bar.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until March 19 for electric hoists, air drills, high speed drills and other supplies for the Eastern navy yards.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 2 for erecting pumps, condensers, &c., and installing salt water pumping system and other equipment at the naval training station at Newport, R. I.

The following bids were opened March 1 for supplies for the Isthmian Canal Commission, circular No. 352:

Bidder 18, Fox Bros. & Co., New York; 22, A. D. Granger Company, New York; 30, Manning, Maxwell & Moore, New York; 56, A. L. Ide & Sons, New York; 58, D'Oiler Engineering Company, Philadelphia, Pa.; 65, Buckeye Engine Company, Pittsburgh, Pa.

Class 1. One tandem compound engine—Bidder 18, $4790 and $5049, 125 days; 22, $2690, 160 days; 30, $4561 and $4861, 180 days; 56, $3085, 100 days; 58, $4180 and $2950, 165 days; 65, $3245, 110 days.

Class 2. One patternmakers' lathe—Bidder 30, $540.18, 90 days.

The following bids for supplies for the navy yards were opened March 5:

Bidder 11, Brooklyn Forge & Supply Company, New York; 20, Brown Hoisting Machinery Company, Cleveland, Ohio; 21, Brown & Sharpe Mfg. Company, Providence, R. I.; 25, Cincinnati Electric Tool Company, New York; 38, Chicago Pneumatic Tool Company, New York; 42, De Zouche, Harrison & Co., Philadelphia, Pa.; 72, Hisey-Wolf Machine Company, Cincinnati, Ohio; 76, Hendey Machine Company, Torrington, Conn.; 80, Ingersoll-Rand Company, New York; 81, Independent Pneumatic Tool Company, Chicago, Ill.; 84, Jones & Lamson Machine Company, Springfield, Vt.; 105, National Electric Supply Company, Washington; 107, Manhattan Supply Company, New York; 108, Manning, Maxwell & Moore, New York; 110, New Jersey Foundry & Machine Company, New York; 111, Niles, Bement, Pond Company, New York; 113, Montgomery & Co., New York; 117, J. Edw. Ogden, New York; 123, Pratt & Whitney Company, Hartford, Conn.; 124, Pilling Air Engine Company, Detroit, Mich; 131, Jno. B. Roache, Brooklyn, N. Y.; 146, Sherman, Brown, Clements Company, New York; 176, Jno. D. Westbrook, Norfolk, Va.; 181, Williamson Bros. Company, Philadelphia; 193, R. W. Geldart, New York; 194, General Pneumatic Tool Company, Monteur Falls, N. Y.

Class 11. One No. 3 surface grinding machine—Bidder 21, $1265.

Class 12. Two No. 2 surface grinding machines—Bidder 21, $971.80.

Class 13. Three Sigourney sensitive drills—Bidder 123, $276.

Class 14. One 24 x 14 in. lathe—Bidder 76, $1835.

Class 15. One 32-in. vertical drilling machine—Bidder 111, $535.

Class 21. Four pneumatic hoists—Bidder 38, $840; 80, $630; 124, $620; 194, $712.

Class 22. Four triplex ammunition trolley hoists—Bidder 20, $640; 107, $565.60; 110, $460; 117, $335.20; 176, $349.96; 193, $518.48.

Class 23. One flat turret lathe—Bidder 84, $1505.

Class 61. Two radial drills and two hand or breast drills—Bidder 11, $463; 25, $127 part; 38, $443; 42, $447; 72, $463; 105, $463; 107, $463; 108, $463; 113, $463; 131, $463; 146, $463; 193, $463.

Class 62. Two air cooled electric drills—Bidder 25, $86 part; 38, $215.

Class 63. Nine pneumatic drills, six angle gears and 500 ft. wire wound rubber hose—Bidder 38, $797.50; 81, $754.55.

Class 102. One patent automatic worm gear steering engine—Bidder 181, $810.

The Atlas Engine Works, Indianapolis, Ind., has been awarded contract for boilers, superheaters and stokers for the United States Capitol buildings, bids for which were opened February 28. The contract price was $97,902.

Under bids opened February 26 for supplies for the navy yards, J. B. Roache, Brooklyn, N. Y., has been awarded class 30, 12 hydraulic jacks, $456.

The following awards have been made for supplies for the navy yards, bids for which were opened February 19:

The Pratt & Whitney Company, Hartford, Conn., class 51, one new model turret lathe, $652; class 52, one new model turret lathe, $1128.

The Potter & Johnston Machine Company, Pawtucket, R. I., class 53, one universal shaping machine, $620.

The Fairbanks Company, New York, class 54, one universal tool grinding machine, $750; class 57, one Brown & Sharpe universal milling machine, $1150.

Wifliam Sellers & Co., Philadelphia, Pa., class 55, two vertical spindle drill presses, $2110.

The Becker-Brainard Milling Machine Company, Hyde Park, Mass., one vertical spindle milling machine, $1210.

The Chandler & Farquhar Company, Boston, Mass., class 165, electric grinders, $247.38.

The Central Metal & Supply Company, Baltimore, Md., class 166, one duplex steam pump, $75.

The George F. Blake Mfg. Company, New York, class 167, one steam pump, $55; class 168, one boiler feed pump, $60.

M. T. Davidson, Brooklyn, N. Y., class 169, two duplex boiler feed pumps, $115.

Vermilye & Power, New York, class 170, one portable test pump, $109.50.

The following awards have been made for supplies for the navy yards, under opening of February 5:

The Niles-Bement-Pond Company, New York, class 12, one heavy forge lathe, $15,885.

The Hyde Windlass Company, Bath, Maine, class 51, two horizontal steam steering engines, $6600.

The Cleveland Punch & Shear Works Company, Cleveland, Ohio, class 52, one radial drilling and countersinking machine, $640.

Under bids opened January 22, for supplies for the navy yards, the following awards have been made:

The Exeter Machine Works, New York, class 2, two hoisting engines, $2200.

The Sprague Electric Company, New York, class 21, one single steel plate planing mill exhauster, $260.

The General Electric Company, Schenectady, N. Y., class 22, one direct current motor, $330.

The Standard Scale & Supply Company, Pittsburgh, Pa., class 23, two rolling mill scales, $203.

The Keystone Steel Casting Company.—This company has just been organized at Chester, Pa., and will shortly incorporate with a capital stock of $100,000. A plot of ground on the Philadelphia, Baltimore & Washington Railroad has been secured upon which it will build a plant for the manufacture of high grade, light and medium weight crucible steel and McHaffie semisteel castings. While plans for the plant have not yet been completed, it is the intention to begin work of construction as soon as possible and to install the best equipment obtainable. The management is thoroughly experienced in the manufacture of castings by the processes it intends to employ. Albert G. Lorenz is president and manager; John J. Buckley, vice-president, and David Coulter, secretary and treasurer.

It is known to comparatively few persons, even in Mexico, that for nearly 18 months the Mexican International Railway Company, a part of the national lines of Mexico, has had a corps of engineers in the field locating a line from the station of Laboe, near Durango, to the city of Guadalajara. The location has now been completed to kilometer 580, or a point near Paso de Sotos, in the State of Jalisco. The main line as surveyed passes about 30 km. to the southwest of Aguascalientes, to which place a branch line has also been surveyed. The camp of the engineering party is now near Teocaltiche, Jalisco.

The Bethlehem Steel Company, South Bethlehem, Pa., has secured a contract, claimed to be the largest of its kind in the world, for a complete pumping plant for the sewerage system of the city of Baltimore, and in connection with that matter has engaged Irving H. Reynolds, Youngstown, Ohio, as consulting engineer. The Bethlehem Steel Company has excellent facilities for the manufacture of pumping machinery and is in a position to consider contracts for large pumping plants. In fact, it has already constructed some of the largest pumping machinery in the country.

HARDWARE

IT is a weakness in the United States Post Office system that the personal equation of the individual postmaster is made a principal factor in the service which his post office gives to its public. The progressive, the old-fashioned, the parsimonious, the neglectful postmaster, each puts his stamp upon the office for which he is responsible. The Post Office Department does not make a systematic effort to procure uniformly good facilities. The result is a wide difference of the service given in cities and towns of corresponding size and importance. The collection and delivery of mail, the conveniences for purchasing stamps, registering letters and sending money orders; facility in getting at officials for information; in fact, all details of the business of the post office, depend for their efficiency on the personal qualities of the postmaster. The service is thus much better in some towns than in others, when as a matter of justice to the public, considering one community as worthy as another, the service should be equally good, all the time presuming that communities are of equal importance. This is radically wrong. There should be rules to determine many of the routine duties of an office. Stamps, for example, should be purchasable at the same hours, or at as many and as convenient hours, at one post office as at another. The same is true of collections and deliveries of mail, of hours that letters may be registered and delivered, and money orders issued and paid. Cities and towns of a given class should not be discriminated against because of the personal make-up of their postmasters.

Post office facilities have a direct bearing upon the prosperity of a community. It is easier and cheaper to transact business where the Government assists with the best of mail service. To an extent this must depend upon railroad service, and where these facilities are poor the postal convenience of the community must be limited to that extent. But inconvenience need not go beyond this. Industries may be handicapped by the inefficiency of the postmaster who creates a low standard of service, and the reverse is true where the postmaster is a wideawake, progressive man, who takes pride in giving his public the best that is possible under existing circumstances. Post offices of the fourth class, those in small villages, may be left out of consideration in this connection, for their facilities must necessarily be limited by infrequency of mails and the small emoluments of postmasters. The three higher classes are divided into numerous subclasses based upon gross annual receipts, the salaries of postmasters being regulated upon this basis. Here is a standard upon which the Government could establish its rules of required service to post office patrons. While it is true that each post office has its own peculiar conditions, such as time of arrival and departure of mail trains, these conditions need not interfere with the general project of putting offices of the same general class on a par of good service.

The hours during which a post office is open for the transaction of its various classes of business are important. The stamp window occupies no small place in the affairs of a community. In the larger cities, say those of more than 75,000 people, there is no occasion for there being a minute of the year when it is impossible to purchase a stamp at the post office. There are clerks on duty during the night, on Sundays and holidays, who can attend to the sale of stamps in connection with other work. This is done in some cities. In one city of 125,000 inhabitants there is never a time in the year when stamps cannot be purchased, and each evening the office is open until midnight for the registering of mail and issuing of money orders, though not for the delivery of registered mail or the cashing of money orders after 6 o'clock. That the public appreciates this is shown in the fact that during the month of January last the night stamp window, open all night, sold stamps to the amount of $1523.20, which is the equivalent of some 77,000 2-cent stamps; registered 610 letters, and issued 420 domestic money orders. Experience shows that business men appreciate the custom and frequently avail themselves of the opportunity to purchase stamps for mail prepared after business hours, including special delivery stamps, and to register mail. Another city of about the same size, and doing a larger gross post office business, closes its stamp window for the night at 9 o'clock and for all but an hour or two on Sundays and holidays. Similar differences exist between the hours of closing mails for important cities, in the face of equally good train service. Though the cities are practically equidistant from New York and the night train service equally good, the last night mail which will reach New York for delivery in the morning closes at 11.45 p.m. in the one instance and 7.45 p.m. in the other. The comparison is merely one of very numerous instances of discrepancy between post offices of the same class.

It would seem no impossible task for the Post Office Department to govern these matters by a system of rules setting forth the regulation of these details of service. The personal equation of the postmaster should be eliminated to as great an extent as possible. There are typical post offices in every subclass, where the facilities are the best possible under existing circumstances. These should be taken as the basis of what all post offices shall be. If this were done the improvement in many places would constitute actual revelations to their people. Mankind becomes accustomed to its conditions and unless driven by circumstances to find out what is lacking is often content to let well enough alone.

In every great business, mercantile or manufacturing, uniformity of practice must prevail throughout the various departments and branches. The post office system of the United States is a business establishment on a very large scale, with an infinite number of branches, each classified as to its importance. It seems only fair play that the usual uniformity should extend through the system, so that the people of the one place should have as good a postal service as those of another place of no greater and perhaps less importance. In business the first rate post office may at times become a great advantage, for quick postal service has often resulted in the capturing of an order or in the transaction of other business in a way to make or save money. The matter of expense is another factor to consider, for where postal service is poor the telephone and telegraph must play a correspondingly more important part, a condition which mounts into dollars during a year. In fact, considered

from the standpoint of the business man, the whole question of good or poor post office facilities becomes to a large extent a matter of dollars and cents.

The work of systematizing the post offices of the country is now in progress at Washington, and the tendency is along the line of universal practice. It must be said in this connection that the Post Office Department is quick to look into complaints of postal service and to rectify evils so far as it is possible to do so. It is to be hoped these efforts will develop into the equalization of service on a high standard, and that there will no longer be favoritism between cities and towns of corresponding rank.

Condition of Trade.

While the past week has not been especially eventful so far as open changes in prices are concerned, the market has chronicled some advances required by the increased costs which the manufacturer is compelled to bear. These include not only higher prices for material, but advances in wages and increase in general expenses, items which in many lines are a very considerable proportion of the total cost. On many goods the high prices ruling for Copper, Spelter, Lead, Tin and Nickel add materially to the cost, and require in many cases a revision of close selling prices. Manufacturers, however, continue to be conservative in making advances, recognizing that prices are now in many lines undesirably though necessarily high and tend to diminish consumption, and thus produce a condition favorable to a reaction, should there be any seriously unfavorable developments in the market at large. The probability of advances in freight rates is also recognized, and far-sighted manufacturers are making their delivered prices conditional upon the maintenance of existing rates. The volume of current business is quite satisfactory. While January and February certainly made a good record, the demand relaxed somewhat, permitting manufacturers in most lines to clear up some of their back orders and get in better shape for the spring trade. Many of them, however, continue to be seriously behind in their deliveries and are subject to constant calls from their customers, not perhaps as urgent as a few months ago, for early shipments of goods. Conservative men are watching with solicitude the tendency toward the enactment of legislation hostile to the railroads and other large interests, and are questioning whether or not the checking of enterprise on the part of the railroads and the development of distrust in financial circles may not militate against the continuance of the existing prosperity.

Chicago.

With no noticeable fluctuation in the general level of prices—which, for the present at least, seem to have reached a state of stable equilibrium—and no unusual movement in the various lines of seasonable goods, the Hardware market is this week without any special news feature. Less and less complaint is heard of stock shortage caused by slow deliveries, and no serious difficulty is now experienced in this direction, except in Galvanized Iron and Wire Goods, which because of unrelieved congestion of mill order books are still subject to delay. The demand for Wire Nails continues unabated, though jobbers report no difficulty in securing current requirements of Cut Nails with reasonable promptness and at market prices. Growing activity in building operations has had a stimulating effect on Builders' Hardware, and trade in these lines is unusually good for the season. A wide tire ordinance, which recently became effecitve in Chicago, has created an unusual demand upon Heavy Hardware stocks for heavy tire sizes, which in 10-ton trucks requires the use of tires 1 x 6 in. Difficulty is experienced in supplying the sizes required by the ordinance fast enough to supply the needs occasioned by its immediate enforcement. No authoritative statement has yet been issued respecting the financial condition of the Trout Hardware Company, which, as reported in *The Iron Age* of last week, was compelled, through inability to meet maturing obligations, to relinquish the management of its affairs, which are now being conducted by a trustee appointed by and in behalf of the creditors. It is expected that a formal statement, showing the exact status of the firm in respect to assets and liabilities, will be made early next week. In the meantime those in closest touch with the situation express the belief that if the present programme of liquidation can be carried out without interference, the best results for both creditors and the firm will be realized.

NOTES ON PRICES.

Wire Nails.—With the approach of spring, demand is increasing rapidly, and persistent calls for prompt deliveries are not unusual. The mills, as a rule, are from six to eight weeks, or longer, behind deliveries, largely on account of car shortage and scarcity of steel. Several mills are asking premiums of 10 cents per keg, at which price they are receiving orders. While rumors of an advance in price continue it has not yet materialized. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.00
Carload lots, to retail merchants	2.05

New York.—Business is very good for the season and weather conditions. Jobbers complain that it is difficult to keep stocks unbroken in assortment owing to delayed shipments from mill. New York quotations are: To retailers, carloads, on dock, $2.19; less than carloads, on dock, $2.33; small lots at store, $2.30.

Chicago.—Under the stimulating effect of springlike weather the demand for Wire Nails is gathering strength and has already attained unusual proportions. Dealers from all sections of the country are importuning for advancement of deliveries, which, in many cases, are coming in too slowly to replenish diminishing stocks. Persistent rumors of an early advance give color to the belief that a raise in prices may be soon announced. Anticipation of such action is doubtless responsible in part for the present rush of orders. Prices remain unchanged and are as follows: $2.15 in car lots to jobbers, and $2.20 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—Spring trade has opened up in earnest and is reflected in the steadily increasing volume of new business being entered by the mills, on the greater part of which jobbers are insisting upon prompt shipments in order to have as large stocks on hand as possible. All the leading Wire Nail mills are from six to eight weeks or longer behind in deliveries, owing to the shortage in supply of Steel and scarcity of cars. The mills confidently expect an enormous volume of business during the next three or four months, and while nothing official has been given out there is strong belief that an early advance in prices may be expected. The market is very strong, and, as previously noted, several mills are asking premiums of 10 cents per keg and are entering business at this advance. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.00
Carload lots, to retail merchants	2.05

Cut Nails.—Mills have a volume of business booked beyond their producing capacity, owing in part at least to their inability to procure the raw material. Transportation difficulties also complicate the situation. Stocks at mill and in jobbers' hands are generally light and as-

sortments are more or less broken. Reasonably prompt shipments command a premium of from 5 to 10 cents per keg over our regular quotations. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $2.05; less than carloads, to jobbers, $2.10; less than carloads, to retailers, $2.20. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—Local demand is light, owing to the season and condition of roads. Jobbers' stocks are more or less broken in assortment because of slow shipments from mill. Jobbers' quotations are on the basis of $2.30 for small lots at store.

Chicago.—Although overcrowding of capacity is reported in many mills, sources of supply are still open from which reasonably prompt deliveries are being made. Jobbers report a good demand, though no complaint is made by them of inability to secure stock within 30 days of order. Quotations are as follows: Iron Cut Nails, car lots, to jobbers, $2.30; to retailers, $2.35; Steel, to jobbers, in car lots, $2.20; to retailers, $2.25.

Pittsburgh.—The Cut Nail mills seem to be getting further behind in deliveries, owing to increased demand and shortage in supply of steel and cars, which operate against output and shipments. Stocks held by the mills and also by jobbers are light and on standard sizes are badly broken. Mills that are in position to make reasonably prompt shipments are able to get a premium of 5 cents to 10 cents per keg over regular prices. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $2.05; less than carloads, to jobbers, $2.10; less than carloads, to retailers, $2.20. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—The demand, which is now heavy, owing to the near approach of Fence building time, is not being satisfied in proportion to the urgency of jobbers, because of the short supply of Steel and lack of transportation facilities. Some mills are reported as seriously considering an advance of the differential between Painted and Galvanized Wire from $6 to $8 per ton, owing to the high price of Spelter. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.15	$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots	2.30	2.60

Chicago.—The season is now open for Fencing work in all territory tributary to this market, and in consequence an overflowing demand is flooding the mills with orders. Because of the limited time available for this work before the usual spring labor begins there is perhaps more clamoring for early shipments of Barb Wire than for other Wire products. We quote as follows: Jobbers, Chicago, car lots, Painted, $2.30; Galvanized, $2.60; to retailers, car lots, Painted, $2.35; Galvanized, $2.65; retailers, less than car lots, Painted, $2.45; Galvanized, $2.75; Staples, Bright, in car lots, $2.25; Galvanized, $2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The spring trade has opened up very auspiciously, and the mills report an increasing demand. Shipments are slow, owing to shortage in supply of Steel and scarcity in supply of cars, and the mills are already considerably behind on contracts. The market is very firm, and an early advance in prices is generally anticipated by the trade. Owing to very high prices ruling for Spelter the question of advancing the differential between Painted and Galvanized Wire from $6 a ton to $8 a ton is being seriously considered by some of the mills, and this may be done before long. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.15	$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots	2.30	2.60

Smooth Fence Wire.—An advance in Galvanized Fence Wire is being considered by manufacturers on account of the high prices ruling for Spelter. The mills are somewhat behind in their orders, and demand continues heavy. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.85
Retailers, carloads	1.90

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—With Fence factories all busily engaged and relying for material to keep their works in operation, much pressure is being exerted upon the mills for prompt dispatch orders, which are nevertheless subject to more or less delay. On account of the high price of Spelter and Galvanized goods an early advance in price, on Galvanized Wire at least, seems imminent. Quotations are as follows: In car lots, to jobbers, $2, f.o.b. Chicago, and to retailers, $2.05.

Pittsburgh.—A heavy volume of business from practically all sections of the country is reported by the mills, which are already considerably behind in deliveries. Stocks held by jobbers are much lighter than usual and prevent them from supplying the needs of their customers promptly. The market is very strong, and while no official intimations have been made an early advance in prices is generally anticipated. The market is very firm, and we continue to quote f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.85
Retailers, carloads	1.90

The foregoing prices are for base numbers, 6 to 9.

Enameled Ware.—Leading manufacturers of Enameled Ware are preparing a new schedule of list prices covering the entire line, which will go into effect March 15. Copies of the list will probably be mailed by different manufacturers to their customers on or before that date. According to report all classes of goods made by these manufacturers will be sold on this list subject to different discounts according to grade, ranging approximately from 40 to 60 per cent. It is understood that the new system will not represent any noteworthy change in prices, but is instituted as a matter of convenience to producers and to the trade.

Poultry Netting.—While manufacturers of some lines seem to be catching up with their orders and making better deliveries, there are other lines, notably Wire products, on which little improvement is reported. Poultry Netting is probably one of the worst features of the market in this respect, manufacturers being from 6 to 10 weeks behind. Some of them are said to be trying to purchase from each other in an effort to fill their most urgent orders.

Wrought Shelf Brackets.—Wrought Iron Shelf Brackets have been advanced 10 per cent., from March 9, by the makers of these goods, present prices being about 75 and 10 per cent. discount from the list for the retail trade.

Bells.—The manufacturers of Bells, on Saturday, March 9, made a concerted advance of about 10 per cent. on these goods. The average price on Common Hand Bells is now represented in a general way by a discount of 50 per cent., Trip Gong Bells, 40 and 45 per cent. discount, and House Gongs, 33 1-3 and 40 per cent. discount.

Wood Screws.—The market for Wood Screws is in excellent condition so far as the manufacturers are concerned, prices being regularly maintained with a large volume of business. Some inconvenience, however, is suffered by the trade on account of slow deliveries, the factories being seriously behind their orders.

Wire Cloth.—There are indications that last season's conditions of shortage in the Wire Cloth market are not likely to be repeated. Pressure on manufacturers seem to be lessening and it is declared that there is no difficulty in placing comparatively small orders on a favorable basis. At the same time it is not known that prices are being shaded and it must be remembered that the

majority of producers have made bookings fairly close to their capacity.

Wrought Butts, Strap and T Hinges, Etc.—An important change in prices on wrought common, bronze plated and japanned Butts, Strap and T Hinges and wrought Shelf Brackets, has been made by concerted action of the leading manufacturers, who have withdrawn old quotations and announce that they are preparing new discount sheets, which will show advances of from 5 to 10 per cent.

Bolts, Stove and Sink.—As reported in our last issue a new schedule of list prices on Stove and Sink Bolts has been adopted by manufacturers and published under date of March 1. Generally speaking the new lists represent advances, varying in amount on different sizes. As regards Stove Bolts, the noteworthy fact is that the round and flat head patterns which have previously been sold on different lists are now sold from the same list, which is as follows:

Stove Bolts.

Round and Flat Head.—Price Per 100.

Size.—Inch.	1/8	5/32	3/16	7/32	1/4	5/16	3/8
3/8	$0.85	$0.85	$0.85	...	...	...	...
1/2	.85	.85	.85	$1.20	$1.20	...	...
5/8	.85	.85	.85	1.20	1.20	...	...
3/4	.85	.85	.85	1.20	1.20	$1.75	$2.65
7/8	.90	.90	.90	1.25	1.25	1.80	2.70
1	.90	.90	.90	1.30	1.30	1.85	2.75
1 1/8	.95	.95	.95	1.35	1.35	1.90	2.85
1 1/4	1.00	1.00	1.00	1.40	1.40	1.95	2.90
1 3/8	1.05	1.05	1.05	1.45	1.45	2.00	3.00
1 1/2	1.10	1.10	1.10	1.50	1.50	2.05	3.10
1 3/4	1.15	1.15	1.15	1.55	1.55	2.15	3.20
2	1.20	1.20	1.20	1.60	1.60	2.30	3.40
2 1/4	...	...	1.25	1.70	1.70	2.40	3.60
2 1/2	...	...	1.30	1.80	1.80	2.50	3.80
2 3/4	...	...	1.40	1.90	1.90	2.60	4.00
3	...	...	1.50	2.00	2.00	2.70	4.20
3 1/4	...	...	1.60	2.10	2.10	2.85	4.40
3 1/2	...	...	1.70	2.20	2.20	3.00	4.60
3 3/4	...	...	1.80	2.30	2.30	3.15	4.80
4	...	...	1.90	2.40	2.40	3.30	5.00
4 1/4	...	...	2.00	2.50	2.50	3.45	5.20
4 1/2	...	...	2.10	2.60	2.60	3.60	5.40
4 3/4	...	...	2.20	2.70	2.70	3.75	5.60
5	...	...	2.30	2.85	2.85	3.90	5.80
5 1/4	...	...	2.40	3.00	3.00	4.10	6.00
5 1/2	...	...	2.50	3.15	3.15	4.30	6.20
5 3/4	...	...	2.60	3.30	3.30	4.50	6.40
6	...	...	2.75	3.45	3.45	4.70	6.60
6 1/4	...	...	2.90	3.60	3.60	4.90	6.80
6 1/2	...	...	3.05	3.75	3.75	5.10	7.00

Nickel Plating, $1 extra per 100, added to list price.

Sink Bolts.—Price per 100.

1 inch by 1/4 inch	$1.70	2 1/2 inch by 1/4 inch	$2.30
1 1/4 inch by 1/4 inch	1.80	2 3/4 inch by 1/4 inch	2.40
1 1/2 inch by 1/4 inch	1.90	3 inch by 1/4 inch	2.50
1 3/4 inch by 1/4 inch	2.00	3 1/2 inch by 1/4 inch	2.70
2 inch by 1/4 inch	2.10	4 inch by 1/4 inch	2.90
2 1/4 inch by 1/4 inch	2.20		

No change has been made in discounts, the market to the retail trade being fairly represented by a discount of 85 per cent.

Paris Green.—Manufacturers have made no announcement of prices for the coming season, and will probably not do so much before the first of April. The delay is caused by the unsettled condition of the Arsenic and Copper market, so that manufacturers are unable yet to determine the average cost of their raw material. Arsenic is difficult to obtain, as the world's supply is not equal to the demand.

Rope.—While no change has been made in the card prices, the lower cost of Hemp has affected the Rope market to the extent of making it easier. Manufacturers are assuming a less exacting position in accepting desirable orders. Some improvement has been reported in demand this week. Quotations are as follows: Pure Manila, 13 to 13½ cents; B quality, 12 to 12½ cents; Pure Sisal, 9¼ cents; No. 2 quality, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8½ cents.

Window Glass.—At a meeting of the Western Window Glass Jobbers' Association, held in Chicago last week, prices were reaffirmed. Demand was reported as improving and a good spring business is anticipated. Stocks in the hands of jobbers throughout the country are said to be lower than at the same period last year. It has not been decided when the Glass factories will shut down, but it is assumed that they will not continue in operation much beyond May 1, if as late as that. Local demand continues somewhat quiet. Jobbers' quotations from jobbers' list October 1, 1903, are as follows: Greater New York, 90 and 10 per cent. discount on all sizes, single and double strength; outside of Greater New York, 90 and 5 per cent. for single, and 90 and 10 per cent. discount for double strength Glass.

Linseed Oil.—Demand is slow in improving, and sales are largely confined to jobbing lots in this market. Manufacturers of Paint have also been slow in sending in specifications on contracts, but are now doing so. Crushers bought the bulk of their Seed at rather a high average price, and are unwilling as yet to make concessions in price to induce large buyers to place orders. Should demand become more active the probability is that prices would be advanced. New York quotations for jobbing lots are as follows, according to quantity: City Raw, 42 to 43 cents per gallon; Out of Town Raw, 40 to 41 cents per gallon. Boiled Oil is 1 cent a gallon over Raw.

Spirits Turpentine.—Owing to a firm Savannah market, with higher prices during the week, quotations in New York have advanced 1½ cents. There has been a fair demand in the local market. New York quotations are as follows, according to quantity: Oil Barrels, 77 to 77½ cents; Machine Made Barrels, 77½ to 78 cents per gallon.

TRADE ITEMS.

R. K. CARTER & Co., 66 Reade street, New York, announce that on April 1 their Pittsburgh office, now located in the Lewis Building, will be removed to more commodious quarters in the new Commonwealth Building on Fourth avenue between Wood and Smithfield streets. The firm is represented in Pittsburgh by E. S. Cox.

THE L. S. STARRETT COMPANY, Athol, Mass., whose New York headquarters are now at 123 Liberty street, expects to move to 132 Liberty street on or about May 1, where the management has obtained much more commodious accommodations and facilities for handling its business. The company manufactures complete lines of Machinists' and Mechanics' Fine Tools in great variety.

INDEPENDENT WHITE LEAD WORKS, St. Louis, has lately opened an Eastern office at 350 Broadway, New York. It is in charge of W. F. Puls, formerly with Neal & Brinker Company, New York.

C. W. FRANZHEIM has been elected president; W. A. Isett, vice-president, and George W. Franzheim, secretary, of the Wheeling Enameled Iron Company, Wheeling, W. Va.

PETER DURYEE & Co., established in 1842, are about to consolidate their two stores by moving to the one at 66 Vesey street and 1-3 West Broadway, New York. They have occupied the building at 227 Greenwich street and 12 West Broadway, built for them, ever since College place was widened from Chambers street to Dey street, about 12 years ago. While they are now but half a short block from the other store, the latter is more conveniently situated on a busy thoroughfare.

THE GRAY & DUDLEY HARDWARE COMPANY, Nashville, Tenn., is preparing plans for an addition to its present warehouse which will double the capacity. Work on the addition will be commenced within a short time.

THE RETAIL HARDWARE AND IMPLEMENT ASSOCIATION OF TEXAS has decided to maintain an official headquarters at Dallas, and for this purpose convenient offices have been secured in the Slaughter Building. The headquarters, in charge of J. W. McManus, secretary, will be known as the dealers' exchange, and the location is within easy reach of the wholesale district and the several hotels. The insurance department which has been established by the association is now in full operation and ready for business. With the economy secured through the medium of the mutual form of insurance it is hoped that many of the members will avail themselves of the opportunity to place a part of their insurance with the new company. It is also hoped largely to increase the membership and influence of the association through the insurance feature.

NATIONAL FREIGHT SERVICE ASSOCIATION.

AT a meeting held in Richmond, Va., on the 7th inst., the National Freight Service Association was organized, with the following officers: President, T. Peyton Giles, Richmond; first vice-president, John Donnan of the W. S. Donnan Hardware Company, Richmond; second vice-president, Douglas Dallam, New York. Executive Committee: John C. Freeman, chairman, Richmond: C. T. Johnson of the Dover Mfg. Company, Canal Dover, Ohio; V. H. Beckham, Seattle, Wash.; E. D. Taylor, Richmond; John Landstreet, Richmond. Legislative Committee: John S. Harwood, chairman, Richmond; S. P. Hastler, Chicago; W. C. Rice, Philadelphia.

The meeting was worked up quietly through correspondence conducted largely by Messrs. Giles and Donnan. The chief object of permanent organization is to interest freight shippers and receivers throughout the United States in a systematic fight to secure better and quicker transportation facilities through legislation or otherwise, and nearly every great commercial and industrial body in the country was represented.

T. Peyton Giles, who has been most active in inaugurating the movement, presided throughout the meeting, both as temporary and permanent president, and John Donnan, who has given much time and attention to the subject, acted as secretary.

John Donnan's Address.

After Mr. Giles called the meeting to order and the roll of delegates was made up, Mr. Donnan made a strong address on the difficulties under which the shippers are laboring, and gave his ideas as to how best to remedy these troubles. He said that conditions confronting the shippers in this country had been unbearable, and that the time had arrived when the subject should be given the best thought of merchants and manufacturers toward its solution. Mr. Donnan read letters showing the slow movement of freight in different sections, and said this meant the loss of hundreds of dollars to the merchants. He continued in part as follows:

If congestion is their (the railroads') excuse let them explain why it is that they always manage to deliver promptly carloads of fruit from California, peaches from Georgia, watermelons from Florida, or any other class of goods of a perishable nature, for which they have to pay if spoiled, while Hardware, drugs, dry goods and other nonperishable freight are subject to such unreasonable delays.

The real cause of the delay is not congestion, lack of equipment, or that the freight trains do not make sufficiently fast time with the interstate shipments, while running, but the railroads hold goods an unreasonable time at the initial points before starting.

At every junction, division, terminal and transfer point of their own roads, shipments are held up; and again, when our goods reach transfer points on other roads, these delays are more aggravated than ever. This last and more serious delay is caused by jealousy of railroad systems, one toward the other, and by their attempt to thwart each other's business by each refusing to handle promptly shipments which originated on other systems.

Among the Hardware organizations represented at the meeting were the American Hardware Manufacturers' Association, National Hardware Association and Southern Hardware Jobbers' Association.

CHARLES MORRILL'S TRADEMARK.

CHARLES MORRILL, 277 Broadway, New York, has just obtained a registered trademark from the United States Patent Office, as here reproduced:

TRADE
MORRILL
MARK

It will be used in connection with the well-known line of Hardware Specialties manufactured by this house, which includes the Morrill Saw Sets, Bench Stops, Hand and Lever Punches, Nail Pullers, Railroad Spike Lifters and kindred articles.

RICHARDS & CONOVER'S FIFTIETH ANNIVERSARY.

ON the 4th inst. the Richards & Conover Hardware Company, Kansas City, Mo., and Oklahoma City, Okla., celebrated the golden anniversary of the founding of the business. It was on March 4, 1857, that J. F. Richards, president of the company, established himself in the Hardware line at Leavenworth, Kan., then a Territory. Mr. Richards formed a partnership with William E. Chamberlin in 1862, under the firm name of Richards & Chamberlin. He purchased Mr. Chamberlin's interest in the business four years later. Col. John Conover, the present vice-president of the company, bought an interest in 1870 and the firm name was known as J. F. Richards & Co. The business was incorporated in 1881 under the name of the Richards & Conover Hardware Company.

The Kansas City house was started in 1875. The company built the four-story brick building at the southeast corner of Fifth and Wyandotte streets in 1881. This building was abandoned in 1902 for the present quarters at the northwest corner of Fifth and Wyandotte streets The Leavenworth house was sold in 1884 and Mr. Richards moved his family to Kansas City in 1887. He became interested in a Kansas City Bank the year previously, being one of the organizers of the First National Bank of that city, of which he is now vice-president.

A branch house at Oklahoma City, Okla, was started one year ago. The business of the company now extends through Missouri, Kansas, Arkansas, Texas, Oklahoma and Indian Territory. Last year the business done by the house is said to have exceeded $3,000,000. The other officers of the company are W. B. Richards, second vice-president; Geo. B. Richards, secretary, and A. L. Ruhl, treasurer.

SALESMAN'S POSTAL.

WE reproduce herewith, somewhat reduced in size, a postal recently sent out by the Kramer Bros. Foundry Company, Dayton, Ohio, announcing the approach of its salesman. It calls attention in an interesting and effective way to the fact that the youngster's "daddy" will soon be along to see the recipient about the company's line of Gem Cement Tools. "Spuddy" in his workmanlike rig paving the way for his father doubtless made a hit with those who received the cards.

Postal Announcing Salesman's Approach.

LUNKENHEIMER COMPANY'S EASTERN BRANCH.

THE LUNKENHEIMER COMPANY, Cincinnati, Ohio, has established its Eastern office and warehouse in much more commodious quarters, in the building at 66-68 Fulton street, New York, recently erected; Alfred J. Jupp managing this division of the company's business. In making provision for an adequate stock from which to supply the Eastern and Atlantic Coast trade easily and quickly it was necessary to use to the best advantage the space on both street floor and basement occupied, and by somewhat unique methods prepare for the accommodation of a large assortment as well as sufficient quantities, so arranging the irregular floor space as to have it attractive in appearance. The building fronts on Fulton street and there is a narrower street on the westerly side, Fig. 1, showing a plan of the street floor, the main features pertaining to shelf accommodations being practically reproduced in the basement, except that many more units are used.

Adaptation of Irregular Floor Space.

The dimensions approximately of the main floor are 35 x 80 x 20 ft. The problem was to utilize such an irregular space so as to combine an office with the necessary shelving for many kinds of goods and yet secure harmonious results. In planning a total of 1400 bin spaces, all 2 ft. deep, the sections were made up into units, each 6 ft. high, 4 ft. wide and 24 in. deep, there being a lower tier and upper gallery in a room with a 13-ft. ceiling. The units are made about half and half, with and without backs. The units are arranged in aisles, backing up to each other, so that each passageway affords access to two groups of shelving, right and left. The same results are obtained above by means of foot walks, the slats or tie pieces of which form rafters for

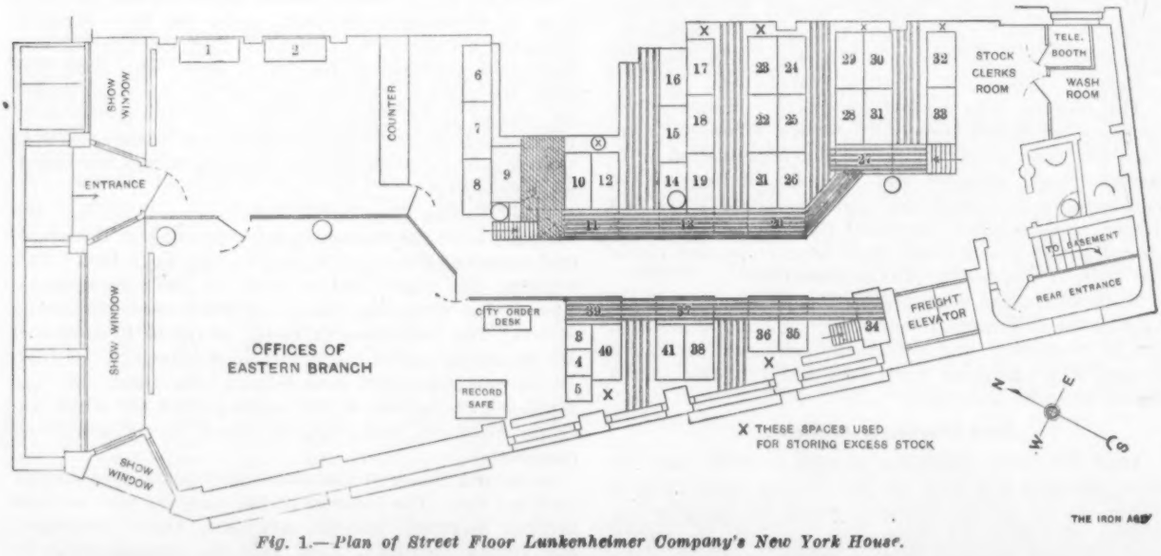


Fig. 1.—Plan of Street Floor Lunkenheimer Company's New York House.

Fig. 2.—View Showing Stock Shelving Arrangement.

the gallery footways, without materially interfering with natural or artificial light, owing to the open character of the construction. The planking of the walks also serves to brace against any lateral movement, likewise affording convenient approaches to the upper courses of shelving. The unit material used is ⅞-in. lumber, black walnut finish and so built in unit form that, if necessary to move it at any time, each section or unit could be readily released from its adjoining unit without injury or having an unwieldly mass to transport from one building to another. In such an event the lighter kinds of stock could remain in the various compartments, the section tipped backward and in this position run onto a cart without breaking bulk.

Location of Units and How Reached.

To better comprehend a skillful adaptation of an unavoidably awkward floor space, as depicted in Fig. 1, it may be explained that the numerals for the most part represent uniform stock containing units each 6 x 4 x 2 ft. Numbers 1 and 2 locate the position of wall sample cases forward of the counter, 3, 4 and 5 designate office sectional units, while the major part of the remainder refer to units containing the smaller articles packed usually in neatly labeled slide cover wood boxes. To properly understand the arrangement of the upper space, used clear to the ceiling, some detailed reference will be helpful. Units 9 and 10 are roofed over to make a suitable space in which to keep stationery supplies. The tops of units 11, 13, 20, 27, 34, 37 and 39 are utilized to provide a connecting runway to the aisles of the upper galleries, indicated in Fig. 1 by the closely spaced lines, the approach to which is by the stairway seen in Fig. 2, at the left.

How the Stock Space is Used.

The view in Fig. 2 is confined largely to the arrangement of the shelving, showing but little of the office itself. On top of Nos. 35 and 36 is set one unit facing the runway; on top of Nos. 10 and 12 there are three units, one facing the runway, the others being reached from the gallery. No. 14 is the only special section, necessarily so on account of the interference of a supporting column. Over units numbered 9, 14-19, 21-26, 28-33, 38, 40 and 41 are placed similar units, facing as do the units below which support them. The several spaces marked X in the diagram are kept for storing excess stock.

Classes of Goods Carried in Stock.

Some conception of the comprehensive stock carried at this depot is afforded by a mention of some of the principal classes of goods made by this company. There are Valves for steam, water, gas and oil; Lubricating Devices, for ordinary gravity and pressure systems, including cylinder and bearing lubrication, and a complete stock of Grease Cups and Mechanical Lubricators, for marine and stationary service. There are also Mechanical Lubricators, for auto and high power motor boats; likewise a comprehensive line of specially designed Cocks and Fittings, for gasoline piping, which the management believes is the largest assortment of kindred goods carried in New York. In Valves there is a stock of bronze goods for high pressure marine service as large as 8-in. diameters up to 300 lb. pressure per square inch. There is also a complete line of Lubricating Devices for gas engines and air compressors. The Lubricating Devices for steam and gas engines and auto service can be obtained in rough and polished brass and nickel plate. The lines of Valves also include standard steam types and also special design for dairy and laundry purposes.

Supervision of Eastern and Foreign Business.

In addition to utilizing New York as a distributing center for the Eastern territory and coast trade the exacting details relating to much of the company's export business are supervised at this office. Special care is given to the packing of all breakable and polished material in serviceable and attractive dovetailed slide cover wood boxes after careful wrapping in paper especially adapted to this purpose, applying alike to all goods, whether designed for domestic or foreign trade.

AMONG THE HARDWARE TRADE.

Thompson Hardware Company has succeeded W. Thompson & Son in Harveyville, Kan., A. A. Denny having purchased an interest in the firm. A retail business will be conducted, including Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements and Sporting Goods.

By mutual consent Culver & Bailey, in Topeka, Kan., have dissolved partnership. Mr. Culver has purchased the interest of Mr. Bailey and will continue the business, which was established 21 years ago, at the old stand, 829 Kansas avenue.

Utterson & Mohler have succeeded Mohler & Dugan in Montrose, Mo., carrying Shelf Hardware, Stoves, Tinware, Agricultural Implements, Paints, &c.

The Amboy Hardware Company, Amboy, Ind., was recently organized with a capital stock of $25,000, and will engage in a general Hardware and mercantile business. The incorporators are Marshal Smith, Frank D. Brown, David Elbert Brown, A. A. Miller and Walker Hayes.

The Hullum Hardware Company, Sayre, Okla., has recently been incorporated with a capital stock of $10,000 and will engage in a retail Hardware and Implement business. The incorporators are J. A. Hullum, S. C. Hullum and J. A. Hullum.

The Iola Hardware & Furniture Company, Iola, Grimes County, Texas, was recently organized with a capital stock of $10,000. The following officers have been elected: A. A. Sanders, president; J. M. Barron, secretary and treasurer.

Lorain Hardware Company, Lorain, Ohio, has just completed a new and splendidly equipped store building which it regards as one of the finest of its kind in the State. It has four floors, each of which is given up to the display of a special line. The company's Plumbing department and Tinshop occupy a separate building in the rear.

THE GEO. W. PITKIN COMPANY, Paint and Color makers, Chicago, has purchased property in Benton Harbor, Mich., and will remove its manufacturing plant and general offices there in April. A most desirable site, containing about five acres, with side track directly into the plant and conveniently situated near all railroads and boat docks, has been obtained and large and commodious buildings are being rapidly pushed to completion. The manufacturing, power plant, general warehouse and offices will occupy separate buildings, and are constructed and arranged so as to make fire practically impossible. The company states that its patrons will receive the same prompt shipment service as heretofore, as Benton Harbor enjoys shipping advantages superior to Chicago in many ways. The greatly increased capacity and convenience of the new plant will enable the company to meet every demand of its constantly enlarging business.

THE JACOBSON MACHINE MFG. COMPANY, Warren, Pa., has completed all arrangements with a new corporation organized in Rock Island, Ill., and known as the Rock Island Tool Company, providing for the complete transfer of the Jacobson Company's Vise business to the Rock Island concern. The Jacobson Company has built up a good trade on these Automatic Vises, and inasmuch as its capacity is taxed with Gas and Gasoline Engine work the company considers it advisable to divide the business in this way. The Jacobson Company will retain a considerable interest in the new concern, and as those engaged in the management of the latter are accustomed to work of this kind the Jacobson Vise business will be well taken care of. The deal was negotiated through the management of the Jacobson Company, who were formerly Rock Island men. The Rock Island Tool Company expects to have the business under way by April 1.

DEATH OF ANDREW W. MILLIGAN.

ANDREW WILLIAM MILLIGAN died at his home in Mount Vernon, N. Y., Thursday, March 7, of paralysis of the heart. He was apparently in his usual health when he retired for the night, but shortly before 2 o'clock in the morning he complained of pains about the heart and died within 15 min. of the attack. His death was entirely unexpected and was a great shock to his family and friends. About two years ago Mr. Milligan broke a leg, which caused the formation of an abscess and proved to be a severe strain on his physical condition, but he was feeling better just prior to his decease than he had for months.

Mr. Milligan was born in Newburgh, N. Y., January 19, 1856, and was educated in the public schools of that

ANDREW W. MILLIGAN.

city. When 21 years old he went to New York and was employed by what is now the Dunham, Carrigan & Hayden Company, New York and San Francisco. He remained with that house until the formation of Miller, Sloss & Scott, San Francisco, in 1891, of which he was vice-president from the start. When Miller, Sloss & Scott and another representative San Francisco house, the G. W. Gibbs Company, dealing in Heavy Hardware, Iron and Steel, were merged in what since January 1, 1902, has been the Pacific Hardware & Steel Company, Mr. Milligan became its vice-president. For many years Mr. Milligan had been the personal representative in the East of the Union Iron Works, San Francisco, which has built many vessels, both battleships and cruisers, for the United States Navy. The securing of some of these important contracts, particularly the earlier ones, is attributed in great measure to the assiduous and persistent efforts of Mr. Milligan at Washington.

Mr. Milligan had lived in Mount Vernon at different periods for some years and about 1893 was made superintendent of the First Baptist Church Sunday School there. He retired from the Pacific Hardware & Steel Company about four years ago. Last fall he organized the Milligan Company in Mount Vernon, of which he was president, for the transaction of business in real estate. Mr. Milligan was of a very companionable nature and kindly disposition and was held in high esteem by all who knew him. He is survived by a widow and one daughter.

S. W. CARD MFG. COMPANY, Mansfield, Mass., manufacturer of Taps and Dies, which at present occupies the premises at 123 Liberty street, New York, will about May 1 move to 132 Liberty street, where greatly increased facilities will be available and a better service possible to its trade.

REQUESTS FOR CATALOGUES, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM KILGON, HAYDON & PAYNE, San Angelo, Texas, wholesale and retail General Hardware and Buggies. Messrs. Kilgon and Hayden were formerly in the Hardware business at Athens, having been succeeded there by Eugene Spencer. At San Angelo the new firm is erecting a building 65 x 100 ft.

FROM D. A. CORNELSEN, who has purchased the store of Winkley Bros. in Aulne, Kan., and will handle a line of Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints and Sporting Goods.

FROM PICKERING HARDWARE COMPANY, which has been incorporated with a capital stock of $9000 in Bellingham, Wash. The company will conduct a retail business in Shelf and Heavy Hardware, Paints, Sporting Goods, Doors, Sash and Plumbing.

FROM CHARLES H. HILDEBRANDT, 107 Chambers street, New York, who began business on his own account the latter part of last year, after having been in the employ of the F. T. Witte Hardware Company, for a term of years. He is handling Hardware and Manufacturers' Supplies, making a specialty of furnishing material to producers. He will be pleased to receive illustrated and descriptive catalogues from manufacturers of Heavy Hardware, Shelf Hardware, Mill Supplies and Tools, Agricultural Implements, Automobile Supplies, and particularly such goods as Drills, Rivets, &c.

FROM GARRETT HARDWARE COMPANY, Waco, Texas, which has lately incorporated with a capital of $60,000, and is in the market for a full line of Hardware. The new company is a continuation of the Earle-Garrett Implement Company.

FROM GEO. GRIGGS, Marquette, Kan., who has purchased the Hardware business of J. E. Hamilton.

FROM BOWMAN HARDWARE COMPANY, successor to the Hardware, Paint and Sporting Goods business of Henry Rawles, Skowhegan, Maine.

FROM SCHOEDINGER & FEARN, Columbus, Ohio, who have just equipped an up to date Builders' Hardware sample room, and want catalogues and discount sheets for their cabinet of Builders' Hardware catalogues.

FROM HULL BROTHERS COMPANY, Danbury, Conn., whose establishment was burned out completely on the 4th inst. The loss amounts to about $60,000, with insurance of $46,000. That the company was not dismayed by its misfortune is evident from the fact that two days later, on the 6th, it had occupied a "new office on the ruins and was doing business at the old stand." All its books and papers having been destroyed, the company begs that manufacturers and jobbers having accounts with it send statements and duplicate invoices for new files. In addition, the company requests catalogues and discount sheets. Work has already been commenced on a new building.

FROM KORBETT OF KENSINGTON, INCORPORATED, which has lately opened up in the Hardware and Contractors' Supply business at 746-748 Gravesend avenue, Brooklyn, N. Y.

FROM WILLIAM S. SILPATH, 1829 Dudley street, Philadelphia, Pa., who contemplates opening a Hardware store in that city, and would be pleased to have catalogues from manufacturers of General and Builders' Hardware, Contractors' Supplies and Ship Chandlery.

WINDOW ADVERTISING.

AT the annual meeting of the Iowa Retail Hardware Association, held at Des Moines February 19-22, E. H. Simmons, one of the vice-presidents of the Simmons Hardware Company, St. Louis, read a valuable paper on window advertising, which is given below. To illustrate and enforce some of the points made in his paper Mr. Simmons, assisted by a corps of window dressers from the Simmons Company, prepared two window displays which were inspected with interest and instruction by the members of the association in attendance at the convention. The exhibits appeared in the windows of the Garver Hardware Company's store, which is located in the immediate vicinity of the Christian Church Auditorium, where the convention was held.

One of the window exhibits, described as the George Washington window, is reproduced herewith. This was a Tool display and was an effective presentation of this line. It will be observed that the window contained a number of signs, price cards, &c., some of which are not clearly shown in the illustration. The figure in the left-hand corner was equipped with clockwork and was in constant motion, thus catching the eye of passers-by. The top, bottom and sides, also the back of the window, were decorated with tissue paper. About $1.25 would, we understand, cover the expense of preparing the exhibit thus made. The other window display was devoted to Cutlery, and the main idea in getting it up was to secure a good effect at the lowest possible cost. The principal item of expense in this window was the crepe tissue paper, in various colors, about 35 cents worth being used. The plates or holders on the back of the window showing the Pocket Knives are supplied free by some Cutlery houses. A good many signs and cards appeared in the window, the cost of which was trifling, being made from white cardboard and a set of rubber stamps of various sizes kept on hand by the merchant.

George Washington Tool Window.

Mr. Simmons' paper as read at the meeting of the Iowa Association was as follows:

Good advertising consists in keeping your name and goods before the public in the right way. You must let the public know you are in business. Window dressing is one very good form of advertising, and one of the main things in dressing a window is simplicity. It is effective alike in small towns and in small stores, and its main object is always to get the people into the store.

Definite Plan.

Do not start in to dress your window without first having some definite idea of what you are going to do. Decide upon the general plan, select a definite line of goods and as far as possible limit the articles used to that particular line. In arranging your display stick to one line of goods; don't mix up Lawn Mowers and Carpenters' Tools with Stoves and Razors. If you are showing kitchen goods, don't show anything else; if Cutlery, don't mix in Tools and Enamelware. It is better to divide your window into three or four parts and have each distinctive, for if you mix the different lines you confuse the mind of the observer.

Concentration Is Most Effective.

A limited stock of goods does not permit one to put many articles of the same kind in a show window. I recall a window display in a small store in which 14 Hand Saws were shown, and another which contained a border made of 36 Pudding Pans, all of a size. The approved method of modern buying is to buy often and in small quantities, and stocks thus assorted do not permit of this kind of decoration. A few goods well displayed are better than a large quantity thrown together.

The Unfavorably Located Store.

The location of your store has much to do with results from window dressing. If you are located on a main street you are fortunate, but if your store is not so favorably located you must then do something to attract people to your place of business. There are many things you can do to accomplish this end. You can, for instance, paint the front of your store red or blue, or put in good hitching posts for the farmers, a watering trough, or some other convenience. A good sidewalk will help to bring people to your store, if it is out of the main line of travel. It may be profitable even to help your neighbor to build his sidewalk, if he happens to be between you and the main street. Have a good big sign in the day time and if possible plenty of light at night. It is necessary for you to make it easy for the observer to reach your store if you want him to look at your show window. After you get the people to your store

there should be something to attract attention to the window.

Have a Good Sized Sign in Your Show Window

that can be read at a glance. Next have something in the window to hold their attention after it is thus attracted. The lighting of a show window is an important consideration. Never throw window lights in the eyes of the people, but rather throw them on the goods themselves. It is the goods you want to show up, not the people. Windows well dressed appeal to the eye as does a well dressed woman; and the easiest and most effective way to appeal to the public is through the eye. As an evidence of this fact you will note the profuse illustrations shown in the papers and magazines of to-day. Now, assuming that you have attracted attention to your windows, and people have stopped to look into them, the next, and all important thing, is to get the people into the store.

Numerous Small Signs

telling about the goods in the window will be found a great help to this end. The average person who stops becomes interested in some article, and wanting to know more about it will go into the store to make inquiry. These little signs and cards are very cheap salesmen, they are easily and cheaply made, and make many a sale by telling the party about the article shown; and moreover, they draw no salary.

A Window Test.

An interesting way to test the effectiveness of your window is to go outside and count the number of people who pass your store at the busiest time of day within a given time. Note the number that go by, those that only glance at the window, those that hesitate in front of it, then the number that are sufficiently interested to stop and look in, and finally the number that after looking go into the store. We all want something for nothing, and if you can convince the people either through your store windows or otherwise that they are getting the most for their money from you, you will get their business; they will come into your store.

Don't Forget That People Like to Read Prices,

and that price tags on goods in your display window help to bring them into the store. There is an old saying like this: "A picture and a price, a price and a picture." The window is the picture and the price tag on the goods completes the impression.

Keep Your Show Window Up to Date

by buying new articles; put a few of them into your show window and see how they take with your trade. Bulletins of current events, weather bulletin, or reading matter of a striking nature displayed in your window attracts attention. Suitable pictures of various kinds taken from current publications will arrest the attention of passers-by and cause them to stop and look into your window. Dress your windows according to the seasons. Watch for special days, such as Washington's Birthday, St. Valentine's Day, Christmas and other holidays.

Outside of the goods from your own stock there is very little needful expense in making an attractive window display. Sets of rubber stamp alphabets are inexpensive and, with a little cardboard, you can make your own signs and price tags.

Motion in the Window.

If there is one thing that more than another will attract attention to a show window it is motion. In displaying your goods in the window, try to have each article doing something or at least simulating motion. Have some chips scattered about your Hatchet, have a board with shavings lying about just taken from the Plane, show an Auger Bit half way through a plank, the Farmer's Knife stuck in an ear of corn, the Paring Knife in a potato, and so on through the list. Articles thus displayed will attract 10 times as much attention as they would without these accessories. If you have not power or machinery to run moving articles, get some small mechanical toy that will move or run. Above all have motion or life in your window; for motion is life and life is attractive.

CONSULAR SERVICE AND OUR EXPORT TRADE.

IMPROVEMENT of the consular service is a cry that has become familiar in the course of the last year or two. How that service can actually be made to produce results of tangible value to American commercial interests is a question which merchants and manufacturers may well consider. The changes so recently made in the system governing the service and only just being inaugurated are too well known to require reference. It may be repeated, however, that the emphasis now being placed upon the commercial aspect of the consular service is illustrated in the requirement, before an applicant's appointment, of an examination in "the natural, industrial and commercial resources and the commerce of the United States, especially with reference to possibilities of increasing and extending the foreign trade of the United States." This sounds promising in theory. Practically, what results will follow? Cannot the Consuls thus appointed be so guided by instructions from Washington that intelligent efforts may be anticipated? And is it not a fact that such instructions will have to originate in the majority of cases immediately from the men of business who, better than any one else, know what they want? The consular force consists of 310 Consuls-General and Consuls, plus 5 Consuls-General "at large," 13 consular clerks and 7 student interpreters. Here is a force of men scattered all over the world who ought to be of enormous assistance to our manufacturers. What have they actually accomplished in the past—how can we use them in the future?

Consular Importance.

For years it has been the fashion to ridicule the American Consul. Speaking in a very general way, he has deserved all that he got. The consular service has been popularly regarded as the ultimate refuge of the broken down politician, or a convenient exile into which Senators or Representatives might shove a persistent office seeker. We are careless with our titles in America; almost every one who has not written a popular novel is an "Honorable" nowadays. But we sometimes regard the holders of these courtesy titles far too lightly. We at home in the United States are apt to rank a Consul somewhere below an alderman or a school commissioner. We forget, both before and after his appointment, that the Consul when he takes his post becomes at once a person of dignity and importance in the foreign community where he resides, where he is the official representative of the United States of America; that in the great majority of cases, where the existence of a Minister or Ambassador is scarcely appreciated, the Consul is the sole official representative of a great nation. His position in a foreign country is, therefore, absolutely dissimilar from any he could here obtain. And by reason of his position and the consequent dignity which is, or ought to be entailed upon him, the Consul is prevented from certain efforts in behalf of our commercial interests which a manufacturer's salesman, for example, would be expected to undertake. Not a few American manufacturers have in the past shown themselves angry and disgusted because a Consul has not taken their catalogue in hand, gone out into his market and promptly sent them orders for their wares, accompanied by cash in full.

Great Room for Improvement.

Our consular reports have sometimes called forth the praise of our rivals—curiously enough, it would seem, for while a certain improvement is to be noted of late, there still remains an enormous change for the better that may be, ought to be, accomplished. In the making of trade reports lies one and the commonest phase of a Consul's usefulness. Unfortunately only about one in a thousand reports now, or up to now published is of much practical value to the American manufacturer or exporter. Any issue that may be chosen of the "Daily Consular and Trade Reports" will be found to contain little beyond a more or less entertaining assortment of effusions. It is but rarely that a "report" contains a suggestion likely to lead to business, or by a recital of

conditions tending to help the exporter in this country to an intelligent idea of the market.

Limitations of Consuls.

It is manifestly absurd to expect to get 310 men in consular offices who are technical and trade experts in every branch of commerce from Hinges to Steel Rails, and from hams to cotton goods. The manufacturer of Padlocks will probably be prepared to admit, if he will stop to think about it, that but few of the 310 Consuls can be expected to appreciate the special or technical features of his business as he himself does. If the Padlock man, then, wishes helpful information about prospects for his wares in foreign markets, instead of putting out a general inquiry: "What are the prospects for Padlock business?" why does he not submit a specific list of questions covering the information that he needs and explain at the same time in a nontechnical way what ..e goods are that he makes and for whose benefit he wants the information outlined? But let the Padlock man consider his questions carefully. Let him put himself so far as he can into the Consul's place, remembering that the Consul probably has never had anything to do with Padlocks in his life, and that there is certain information which it will probably be a physical impossibility to obtain. And, above all, let the Padlock man make up his own mind exactly as to the essential things that he wants information about, and put his questions covering those points in a way that cannot fail to be understood by an outsider. Only a few years ago a prominent American manufacturer addressed a circular letter to the entire consular corps, reading much after this fashion: "Will you please report at once and fully as to what market there is in your district for Drop Forgings; what is the amount annually imported and from what sources; what are the average net cost prices and what are the names and addresses of the responsible merchants handling these goods." It is not surprising that this manufacturer received but few replies, nor that at least one-half of the letters that did reach him inquired politely as to what under the sun Drop Forgings were anyhow, or what sort of Drop Forgings were referred to.

How to Make Reports Instructive.

To put the boot on the other foot, how can a Consul make his reports of some interest and value to the trade to which he addresses them? The Consul, in his turn, ought to try to put himself into the manufacturer's place and ask himself what is it that the American exporter will want to know about these goods in this market. And before he attempts any inquiries it would seem reasonable to expect him to post himself as well as possible on the goods which he has in mind. Then he can map out his proposed report and seek reliable information under each heading that he has specified. As an incomplete and unsatisfactory report, one recently printed may be cited, which apparently attempts to say that there exists in the Consul's territory an opportunity for the increase of American trade in a certain line of goods. This report reads:

> A United States manufacturer introduced an excellent Oil Cooking Range, which was retailed at a moderate price. It sprang into immediate popularity and commanded a large sale. Other Oil Cooking Ranges, similar in appearance and offered at a lower price, were soon in the market. They were said to be made in Germany. It has taken time to demonstrate that these Ranges are inferior to the American make, but this has happened, and in the future, with proper pushing, American Cooking Ranges and portable Stoves should be used in much larger numbers.

This report is, after all, hardly a fair sample, for it is far better than many that are daily printed in Washington. But if the Consul is to advocate an effort for increasing exports of American Oil Stoves to this particular country, why does he not give further data that will be of assistance to and will serve to stimulate other American manufacturers of similar goods, if any exist? While it is understood that it is no part of a consul's duty to betray the secret of any American house that has by its enterprise or good fortune opened up a new market, still it is not to be denied that it certainly is his duty not to protect any one house to the exclusion of others where opportunities for others exist. And it happens to be a fact, though this Consul does not say so, that in this particular city there are a number of merchants seriously inquiring for a competing manufacturer because they prefer to handle a line distinct from their neighbors. Since, if they are so disposed, it will be easy for them either to take up European goods or ultimately to find another American line, why is it not the Consul's plain duty to report more fully on this opening, to give an idea of what sort of Stoves are required, what patterns, sizes and (approximate) prices have proved successful in the market? To say that it is blue-flame and not wick Stoves that are required, perhaps to give an idea of the volume of the business already being done, at least as illustrated by the demands of one of the dealers? Twenty suggestions naturally present themselves. If a newspaper reporter were sent out by his editor after a story, the chances are strongly in favor of his losing his job that same night if he returned to his office with a similarly boneless report. And a consul is very much in the position of a newspaper reporter, so far as his trade observations go.

A Suggestion.

In this connection it may be to the point to inquire whether a good deal of effective work might not be promoted in different branches of manufacture were the several associations, local, State and national, to take up the question by appointing committees, whose duties it should be to inquire of individual manufacturers as to the foreign information desired, afterward digesting, editing and formulating the replies received into an intelligent series of questions to be put before the consuls. Such questions ought to be very strictly specialized. It would be quite impossible to get the useful reports desired were, for example, Padlocks, Files and Meat Choppers included in one general inquiry, and many times worse if the inquiry covered so general a subject as "Builders' Hardware." A similar effort has been made recently in the case of an association of cotton manufacturers, but the inquiry sent out was so absurdly general and indefinite that it is not surprising that the reports received contained very little of real value. The watchword of the manufacturer, as well as of the Consul, might very well be, "The other fellow is not a mind reader."

How Foreign Trade Was Increased by a Consul.

But consuls can do something more for our commerce than merely write an occasional trade report. They can sometimes, and, far more frequently than is generally known, actually do put a manufacturer on the road to a profitable business, or direct foreign merchants' attention to lines of American goods that might be handled profitably, nursing along the developing interest until a permanent market is established. Perhaps no better illustration of consular activity in this direction can be instanced than the story of a certain Consul-General appointed about seven years ago. When this official arrived at his post he found that while the exports from his district to the United States were very large, the total imports of American goods amounted only to about $90,000 a year. To-day the business there in one line only of American goods exceeds $100,000 a year, in another line $75,000, both of them developed since the Consul's arrival, and one American house has a business in that territory of about $125,000, every penny of which, as well as the whole increase in American business, is owing to and directly due and traceable to this Consul's initiation.

Method of a Competent Consul.

The Consul in question happened to be a business man. His first idea was to obtain direct steamship communication with the United States with consequent quicker transit, cheaper freights and avoidance of transshipment. He studied the situation long and carefully. He found that there were more than sufficient return freights to the United States always available to justify that part of the voyage. Being an eminently practical man, the Consul determined to develop a basis for cargoes outward from New York, and he knew that it is bulk stuff only that answers that purpose in the eyes of steamship agents, that no ordinarily available quantity

of package goods is sufficient to justify a steamship's voyage. In his local market the Consul discovered a chance for American flour. Our prices were right, at that time, and after one or two trials orders began to mount up to thousands of bags at a time, and the Consul had solid grounds on which to approach the steamship people. The effort was weary and discouraging, but at last a trial ship was despatched and the "direct line" established. That the "line" did not continue for many months, and that the trade in American flour soon died a natural death, cannot be laid at the Consul's door.

Some Permanent Results.

Meanwhile freight rates had been cut down from 35 or 40 shillings per ton to 20 shillings, and sometimes less, where they have ever since remained, for the competition engendered by the establishment of the direct sailings and by the Consul's unremitting efforts to spur on both the American manufacturer and the local merchants ultimately resulted in the increase of business already noted. Let no one suppose that the efforts involved were easy or pleasant work for this Consul. Very much to the contrary, for n addition to the labor of investigating conditions and carrying on the large correspondence necessary, the Consul spent a great deal of the time allotted him for leaves of absence (without salary) in personal work, and was further obliged to exert all the political influence that he could command in Washington to obtain liberty from the State Department, as it then existed, to do some things usually forbidden consular officials.

Possibilities of the Service.

The story illustrates possibilities of this service, which too many manufacturers regard with an expressive shrug of the shoulders. It is true that there are consuls who are of little use commercially, but in most such cases it is because they do not know how, not that the inclination is lacking. The service might easily be assisted by the guidance of our manufacturers themselves, and it is believed that the present Administration, as well as the temper of the people at large, is strongly in favor of weeding out incapable officials and substituting men of suitable timber as fast as possible. Meanwhile, manufacturers who have met with disappointment in individual cases will do well to reflect before condemning the whole consular service, and to remember that commercial considerations are not the only ones that occupy a consul's time and attention.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

VULCAN PLOW COMPANY, Evansville, Ind.: Catalogue and price-list illustrating Walking and Sulky Plows, Plow Repairs, Equalizers, Double Shovels, &c.

SUPERIOR TAP COMPANY, Springfield, Vt.: Catalogue No. 2 relating to lines of Taps, Dies, Screw Plates, &c.

SESSIONS CLOCK COMPANY, Forestville, Conn.: Illustrated catalogue No. 62, with accompanying revised price-list, referring to Sessions Clocks.

STAR ENAMELING & STAMPING COMPANY, Pittsburgh: Catalogue No. 10 illustrated in colors, listing gray mottled, blue and white and white lines of Enameled Ware.

STAR HEEL PLATE COMPANY, Louis Sacks, proprietor, Newark, N. J.: Illustrated catalogue No. 11, referring to Star, Boston and Union Heel Plates and an extensive line of Shoe Lasts and Stands, Cobblers' Outfits, Shoe Hammers, Foot Rests, Shoe Rasps, Files, &c.

WRIGHT WIRE COMPANY, Worcester, Mass.: Catalogue handsomely illustrated, referring to Wheelock Rustproof Fences, Guards, Gates, &c.

KILBOURNE & JACOBS MFG. COMPANY, Columbus, Ohio: Catalogue No. 32 D, referring to contractors' Dump Cars, Carts and Skips, and general catalogue No. 34, referring to an extensive line of Wheel and Drag Scrapers, Wheelbarrows, Plows, Steel Sinks, &c.

LANDAY STEEL RANGE COMPANY, St. Louis: Illustrated catalogue of Matchless Steel Ranges.

HART & COOLEY COMPANY, New Britain, Conn.: Illustrated booklet referring to H. & C. Wrought Steel Lockers.

WESTERN WHEELBARROW & MFG. COMPANY, Kansas City, Kan.: General catalogue No. 4, 1907, illustrating a large line of Trucks, Wheelbarrows, Lawn Swings, &c., together with list prices of same.

E. G. SCHUTTE & Co., Cincinnati, Ohio: Illustrated price-list circular referring to their Cincinnati Chain Ice Tongs and an extensive line of Ice Tools, including Picks, Shavers, Saws and Scales and Cold Chisels. The company states that it manufactures Ice Tools of every description, and the original Cincinnati Chain Tong.

DETROIT WIRE & IRON WORKS, Detroit, Mich.: Large illustrated circulars referring to ornamental Iron Fence, Gates, Window Guards, Furniture, &c., and Smith's Improved Marty pattern Mouse Trap.

REED & PRINCE MFG. COMPANY, Worcester, Mass.: Illustrated catalogue and price-list of Stove and Tire Bolts, Nuts, Screws, Rivets, &c.

CHAMPION TOOL & HANDLE COMPANY, Evart, Mich.: Catalogue J illustrating and listing an extensive line of Lumbering Tools, &c.

GEO. W. PITKIN COMPANY, Chicago: Price catalogue No. 55 referring to Paints, White Leads, Varnishes, &c.

WABASH SCREEN DOOR COMPANY, Chicago: Catalogue handsomely illustrated in colors referring to Wabash Stove Boards.

BUTLER BROS., 495-497 Broadway, New York: Spring edition of the company's catalogue, "Our Drummer," for retailers only, with prices guaranteed during March or until the April catalogue is issued.

DEATH OF JOHN A. MARKLEY.

JOHN A. MARKLEY, who died February 20, at his home, 2125 Calumet avenue, Chicago, aged 84 years, was for 30 years a prominent and highly esteemed Hardware merchant of that city. He was born at Frankfort, Ky., and received a common school education at Madison, Ind. His youth was spent on his father's farm at Milton, Ky., and at 20 years of age he began the study of law with Hon. William McKee Dunn at Madison, Ind. Later he engaged in the mercantile business in New Orleans, and when the Mexican War broke out he was commissioned as lieutenant, and served as quartermaster until the end. After a brief business experience in Cairo, Ill., in partnership with Captain W. P. Halliday in the commission and banking business, he moved to Chicago, and in 1865 went into partnership with John Alling under the firm name of Markley, Alling & Co., to do a jobbing Hardware business. Of this firm he was the financial head until his retirement in 1895.

Mr. Markley had a forceful personality, which led him to espouse a cause with enthusiasm or to combat it with vigor and pertinacity. Yet he was equally courteous to those who agreed or disagreed with him, having the charming manners which are not always among the possessions of a busy merchant, but which mark the true gentleman. Conversation with him was always enlivened with an apt story or a quaint illustration, and his criticisms or differences left no sting. He is survived by his widow and daughter, Mrs. Wm. Vincent Baker, and a granddaughter.

Shortly after April 1 a new Hardware firm under the name of Cobb, Whyte & Laemmer Company, will begin business at 45 South Clark street, Chicago. The moving spirits and organizers of the new firm are C. J. Cobb, T. P. Whyte and J. E. Laemmer, all of whom have been connected with the Orr & Lockett Hardware Company from 16 to 20 years, and George E. Noyse, of the Wells & Nellegar Company. These gentlemen leave their respective employers with their best wishes and good will, and because of their ability and experience a large measure of success is predicted for the new firm.

Correspondence.

MANUFACTURERS' MAGAZINE ADVERTISING.

To the Editor: Is there any good reason why a manufacturer should not have the right to advertise his own brands of goods to the consumers, for the purpose of creating a demand for same? is the question that naturally arises in the mind of a manufacturer after reading your editorial of February 28.

In these days when jobbers are pushing their own private brands of goods so strenuously, must a manufacturer who takes pride in his brands sit supinely by and suck his thumbs and say to himself: "It is too bad that the jobbers are getting a large business on their private brands, through an army of salesmen and by plenty of advertising, and here I am obliged to wait for Mr. Hardwareman to tell me when he wishes to purchase my goods?"

It is possible that there are some manufacturers who are willing to take a back seat and assume the attitude mentioned, but we must say frankly that for ourselves we believe that the manufacturer has as much right as any one on earth can have to exploit his own brands to the public, so as to make them popular and create a demand for same either by advertising in popular magazines or through any other legitimate source whereby the result will be that the retailer and the jobber will derive the benefit therefrom.

No Desire to Retail.

Please understand that we are not advocating manufacturers doing retail business, and thereby cutting out the dealer and the jobber. That point is entirely out of the question and does not enter in this at all, although we see that you intimate in your valued editorial that manufacturers are resorting to the method of advertising in magazines, &c., for the purpose of selling their goods direct to the consumer. It is, of course, possible that there are some manufacturers who have that purpose in view, but we are speaking strictly for ourselves and other manufacturers who have adopted magazine advertising as a method of bringing their brands before the attention of the consuming trade.

Any one who has been engaged in the manufacturing business knows very well that the old process of working up a demand for one's goods among consumers by trying to get the jobber to sell them to the dealer, then to have the dealer push them over the counter to the consumer is a mighty slow one. It might have been well enough 100, 50 or 25 or even 10 years ago, but it will not do for this day and generation.

An Invalid Objection.

We are at a loss to understand why any retail Hardware dealer can have any valid objection to manufacturers advertising in this manner. Of course, a dealer might say, "I do not wish or propose to handle" a certain manufacturer's goods, but that is another question, because even after a manufacturer has created inquiries or even a demand for his goods the dealer is not obliged to carry them in stock unless he wants to. This is a free country and every man has a right to do that which he thinks for his best interests. But a dealer's not wanting to handle a certain manufacturer's goods is surely no valid objection to that manufacturer advertising his wares in the magazines, newspapers or through any other legitimate source whereby he can reach the consumer's attention.

Introducing a New Article.

Go into a retail Hardware dealer's store with a new article or a new brand of goods to take the place of some other brand that he is handling, ask the dealer to put them in stock; what is the answer in 999 cases out of a thousand? Practically this: "I am very sorry, sir, but there is no demand for your brand of goods among my trade, and my clerks are too busy to take time to try to introduce them for you. You work up a demand and maybe some day I will handle them."

Go into a Hardware jobbing concern, tell the buyer that you have the best line in the world; show him your samples; get him to admit that the goods are everything that you claim for them, and if he has not handled them before what will his answer be in 999 cases out of a thousand? "I am very sorry, sir; your goods are fine, and I don't donbt but that they are all right, but there is no demand for them in our territory because so and so's goods have the call. Whenever you work up a demand for your line among my customers, then I will talk to you about putting them in stock."

The Reason Why.

Now, Mr. Editor, will you kindly answer this question: If you were a manufacturer trying to introduce a good line of goods under your own brand, and you should meet with that kind of a rebuff from the jobber and the Hardware dealer, what would you do? Would you decide it was no use to try any further? Would you close down your factory? Would you sit over in the corner and wait until the Hardware people said, "Mr. Manufacturer, we have heard of your goods and now we want them?" or would you get a good, up to date, first-class, twentieth century move on yourself and advertise your goods to as great an extent as your capital would allow you to do and thereby endeavor to create a demand that would hasten the day when Mr. Dealer and Mr. Jobber would be glad to put your line in stock?

That, as we understand it, is the reason why certain manufacturers are advertising, and not because they want to retail 1 cent's worth of their wares direct to the consumer.

It seems to us, therefore, that the retailers who have been discussing this matter in their conventions have inadvertently overlooked the main point.

Drifting Along Destructive.

The manufacturer who to-day allows things to drift along and who is only selling goods where the trade asks for them is, in our opinion, simply letting himself go to seed, as it were. Of course, such a manufacturer might have an old established business and be doing mighty well in these prosperous times, but when the day comes —if it ever does—when things get dull again, then it will, we think, be a question of the survival of the fittest, and we have an idea that the fellow who advertises will be "in it."

Jobbers' Special Brands a Menace.

Another point, and one which we have hinted about, is that of the jobbers' special brand. There are certain manufacturers to-day, who, on account of their immense business, may perhaps think that this special brand question does not amount to much, but some day they will wake up and they will find that they have been making altogether too large a proportion of these private brands as against their own brands. We think it can be said without successful contradiction, that the jobbers who are strenuously pushing their special brands are doing so in preference to any manufacturer's brand that they have in stock. On some lines of goods they are practically out of some manufacturers' brands, while a few years ago they used to sell the latter largely.

Now, the manufacturer in furnishing such special brands may be getting quite a large tonnage, but he is losing out in several ways, all of which is going to react on his own brands of goods, and therefore, on his own prosperity some of these days and a great deal stronger than he possibly thinks at the present time.

Where the Merchant Comes In.

And in this connection we wish to add that if the retail Hardware dealer will stop to think for a moment, he cannot help but realize that the manufacturer who is advertising his goods in such a manner as to reach the eye of the consumer, is benefitting him (the dealer) thereby, because it is a protection to the dealer. The manufacturer advertises goods on which his own name appears. He knows what quality of material is in the article and what it is worth, and therefore what the dealer and the consumer ought to pay for it to get their real money's worth; and the dealer and consumer buying

that article know who they can fall back on if it is not everything that is claimed for it.

Can they say as much for goods that do not bear the manufacturer's name and which are made no one knows where?

Please pardon this long letter, in which we hope we have made ourselves clear on the point that the manufacturers who are advertising through the popular mediums, to reach the consumers, are doing so to protect themselves from false competition, and to protect the dealer and the consumer in the matter of getting the right quality of goods at the right kind of prices and not for the purpose of retailing direct to the consumer. And therefore, in view of the above, we believe that such advertising should be looked upon by the dealers as being perfectly legitimate and for their interest.

MANUFACTURERS' BRAND.

LETTER FROM ED. FORD.

To the Editor: The report of the Indiana convention in *The Iron Age* of February 28 refers to the retailer's opposition to general publicity advertising, stating that "There was a decided tendency to ridicule the value of the inquiries which the manufacturers received and turned over to the trade," &c. The secretary of the Indiana Association has in the past opposed advertising direct to the consumer, even when goods are sold only through jobbers and retailers.

As we look at this subject it is unwise for the retailer to publicly oppose this class of advertising.

Manufacturers Will Continue to So Advertise

whether the retailer likes it or not, and the tendency of the times is: "We save you the middlemen's profits." I know that the sales of several well-known lines would fall off one-half if publicity advertising was discontinued, and this refers to goods sold by retailers and not to consumers direct.

Manufacturers will not discontinue this sort of advertising, but rather increase it, and if the Hardware retailers oppose too strongly they may repent possibly when too late, as there are many other channels to reach the consumer. The average clerk in all lines will sell what the consumer asks for, and if the retailer imagines for a moment he can stop the manufacturer from trying to create a demand for certain brands Mr. Retailer is greatly mistaken.

A Parcels Post Consideration.

Hardware manufacturers as a whole have done their share to prevent favorable parcels post legislation, although not a few who have a desire to sell the consumer direct, but fear so radical a change of methods, do not oppose parcels post, but rather favor it and on many, yes, very many lines, with even a moderate rate parcels post, manufacturers could supply consumers direct at a lower price to the consumer and a better profit to themselves than now enjoyed by distributing through the jobber or the retailer. Manufacturers know that

Well Advertised Goods Are Easiest Sold,

and an incident occurred last week that verifies this statement. A friend of mine was advised to shampoo his fast disappearing hair with tar soap. He called at a drug store, and asked the clerk for "a cake of tar soap." The clerk inquired "what kind," and my friend immediately replied "Packer's," which was wrapped up and given him without comment.

My friend, in relating this matter yesterday, said he expected the clerk to advise him which kind was best for the purpose he intended to use the soap for, but the question was so short, quick and unexpected, and he knew of no other make of tar soap, and had seen the Packer's soap advertised, that he called for Packer's "automatically," so to speak. He knew nothing of the merits of any particular make of tar soap, of which there are dozens, but general publicity advertising made the sale.

Thousands of Sales

are made over the counters every day because of manufacturers advertising direct to the consumer. I heard a jobber recently tell a manufacturer that he had forced him to add the manufacturer's goods to his line by extensive advertising. He had varieties enough, but his travelers sent in orders for the goods, retailers forwarded mail orders, and the jobber really was forced into adding a line he did not need.

Go to a retailer or a jobber for the purpose of soliciting his business on a new article, and unless he is assured of the exclusive sale he will say, "I have no demand for it; create a demand and if it is profitable I will add it," and the manufacturer creates a demand by advertising to the consumer the merits of the Pansy brand.

Factory to User

means advertising largely in mail order publications, cutting out trade papers entirely, no trouble about cash discounts, eliminating special brands, catalogue contributions and a thousand and one petty annoyances. Nothing will help more to bring about this condition than the retailer agitating and resolving that manufacturers discontinue general publicity advertising. It cannot be stopped, or even checked, and the more the retailers protest the more of this sort of advertising will be done.

ED. FORD.

NEW YORK AND NEW JERSEY HARDWARE AND IRON ASSOCIATION.

THE New York and New Jersey Hardware and Iron Association held its eighth annual dinner on Saturday evening, March 9, at the Hotel Astor, New York City. There was an unusually large attendance of active members of the association in addition to guests. A number of representatives of manufacturers of Vehicle Material were also present. The participants gathered in the reception room from 7 to 8 o'clock where friendships were renewed and notes on the year's prosperity were compared. Dinner was served at 8 o'clock in the Yacht Room. Popular vocal selections enlivened the evening, and a professional entertainer rendered excellent sketches between the speeches. P. C. Quackenbush of Paterson, N. J., acted efficiently as toastmaster and happily introduced the various speakers. The gathering, as usual, was characterized by the good fellowship and fraternal feeling for which the association is noted.

Among the manufacturing interests represented at the dinner were the following: E. S. Darlington, Hoopes Bro. & Darlington, West Chester, Pa.; F. W. Wurster, Jr., F. W. Wurster & Co., Brooklyn; R. B. M. Cook and W. S. Comly, Russell, Burdsall & Ward Bolt & Nut Company, Port Chester, N. Y., and L. B. Morris, Cambria Steel Company, Johnstown, Pa. Other guests were M. Eisig, formerly a member of the association, but now retired from active mercantile business, and F. E. Thompson of *The Iron Age*. A gift from Mr. Eisig, a handsome basket of flowers, graced the dining table.

WELLS BROS. COMPANY'S CATALOGUE.

WELLS BROS. COMPANY, Greenfield, Mass., manufacturer of the Little Giant goods, has just issued catalogue No. 22, devoted to Taps, Dies, Screw Plates, Bolt Cutters and Nut Tappers, Reamers, Gauges, Special Tools, &c. Among new tools and machinery included in the catalogue are new assortments in single and full stocked Screw Plates, assortments for Pump Makers, Brazed Brass Tubing, Double and Triple Pipe Die Stocks, Horseshoe Taps, Spindle Stay Bolt Taps, Mud Plug or Washout Taps, Burring Reamers, Gauges Bolt Cutters and Nut Tappers, Ratchet and Tap Wrenches.

STANDARD HORSE SHOE COMPANY, Board of Trade Building, Boston, with works at South Wareham, Mass., has recently issued a new catalogue showing all the styles and shapes of Horse and Mule Shoes, of which it produces a large variety, and which, it is stated, are made from the best quality iron, finely finished. The capacity of the plant is over 100,000 kegs a year, and it is now running full. An attractive advertising sign is being prepared and will soon be mailed to blacksmiths throughout the country. Merchants wishing a supply of these signs are requested to send in their names to the company.

BUTLER BROTHERS' MINNEAPOLIS HOUSE

ON schedule time the new Minneapolis house of Butler Brothers, wholesalers of general merchandise to merchants exclusively, was opened on March 1, and the company is now in position to look after the requirements of its growing trade in the Northwest. The Butler Block is an imposing one and extends 330 ft. on Sixth street, with a frontage of 173 ft. east on First and Second avenues N. The hight of the structure varies from eight stories on First avenue to nine stories on Second avenue, with a basement under the entire building and a sub-basement under a part of it. This provides a total floor area of 541,000 sq. ft., or about 13 acres. Through the property run railroad tracks connecting with the Minneapolis & St. Louis Railway, giving 330 ft. of private track. This permits handling freight in and out of the car over their own platform, saving all cartage and much waste handling. The new building is finely appointed and up to date throughout and lacks nothing that will contribute to the quick and economical handling of business. Nineteen hundred and seven marks the beginning of Butler Brothers' thirty-first year in business and is impressively signalized by the opening of this new and immense house. More than 70 acres of floor space are now afforded by their distributing plants in New York, Chicago, St. Louis and Minneapolis and sample houses in Baltimore and Dallas.

Jack Frost Freezer.

The Sturges & Burn Mfg. Company, Harrison and Green streets, Chicago, Ill., has put on the market the Jack Frost freezer, shown in the accompanying illustrations. It is described by the company as a high grade multiple motion machine, the tub being strong and substantially made from selected material, thoroughly kiln

Fig. 1.—Jack Frost Freezer.

dried to guard against shrinkage, and bound with extra heavy hoops of galvanized iron. All castings and gearings are also heavily galvanized. The beater in the cen-

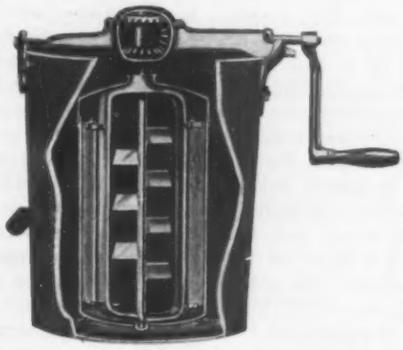
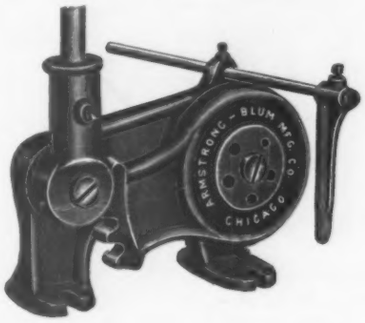


Fig. 2.—Sectional View of Interior.

ter and the scrapers in contact with the inside surface of the can are independent parts in construction and operation, and travel in opposite directions. The can, also moving in an opposite direction from the scrapers, combined with the double action of the interior device, produces an excellent mechanical action for easy, quick and economical freezing. The gearing is simple, compact and completely inclosed. The wearing parts are self-lubricating, with no possibility of oil dripping into either can or tub. The can is said to be made of high grade charcoal plate, heavily tinned and retinned. The freezer is made in 2, 3, 4, 6, 8 and 10 quart sizes.

Marvel Rod Cutter.

The bench tool shown in the accompanying cut is made by Armstrong-Blum Mfg. Company, 104-124 N. Francisco avenue, Chicago. It is designed for the smooth, even cutting of rods and wire, which is effected by circular cutting dies graduated in size up to the limit of the machine's capacity. The operating lever is geared to the cutting lever in a position that makes it easy to use, and guards against danger of injury to the operator's



Marvel Rod Cutter, Lever Handle with Gauge.

hand. The handle lever is fitted in a socket and may be easily removed when desired. It will be noticed that the center of leverage is placed low, lessening the pull on the bench and adding to the tool's stability. An adjustable gauge is provided to facilitate the cutting of duplicate lengths. The cutter is made in two sizes, No. 5, weight 12 lb., having capacity for rods from ⅛ to ⅜ in.; No. 6, weight 35 lb., capacity from ⅜ to ⅝ in.

McArthur Portable Fire Escape.

The McArthur Portable Fire Escape Company, 1999 Clark avenue, S. W., Cleveland, Ohio, represented by Parker & Ernst, 35 Nassau street, New York, has recently put on the market McArthur's portable fire escape and "Jacob's Ladder," here shown. It is intended for permanent use in all kinds of structures by means of

Fig. 1.—Bronze Metal Window Hook.

which, in emergent cases, to make a quick exit, and, in a narrower style for travelers, to be conveniently carried in a trunk. The regular escape is said to have a tensile strength of 1500 to 4000 lb., according to the demand

and style of ladder. Fig. 1 represents one of several styles of bronze metal hooks to quickly grip window frames as the ladder is thrown out of a window preparatory to making a descent; weighing but 9 ounces and having a tensile strength of 3185 lb. Fig. 2 illustrates one style of cast aluminum step and the method of securely holding it, at any desired point, to the four flexible cables or wire ropes, 5-32 in. in diameter, made of galvanized steel wire. The step itself, of cast aluminum, has a flat surface supported by two vertical flanges, truss shaped, with cross braces for uniting the flanges, thus

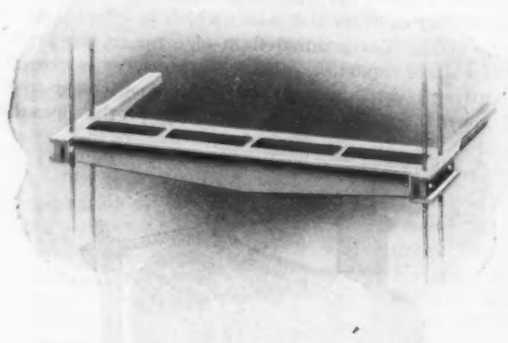


Fig. 2.—Cast Aluminum Step, Showing Method of Attachment.

providing openings at the upper surface of the step which serve both for a firm foothold and a hand grip as well. In the regular ladder the step is 13 in. wide, weighs but 7 ounces, has a tensile strength of 1940 lb., is ⅞ in. deep at ends and 1¼ in. in the center. The inner prongs of the step, resting against the outer wall, give a clearance of 3¾ in. to extreme front, thereby affording a good foothold under trying conditions. At the ends of each step there is a clamping device secured in a box shaped orifice against the four cables and tightly

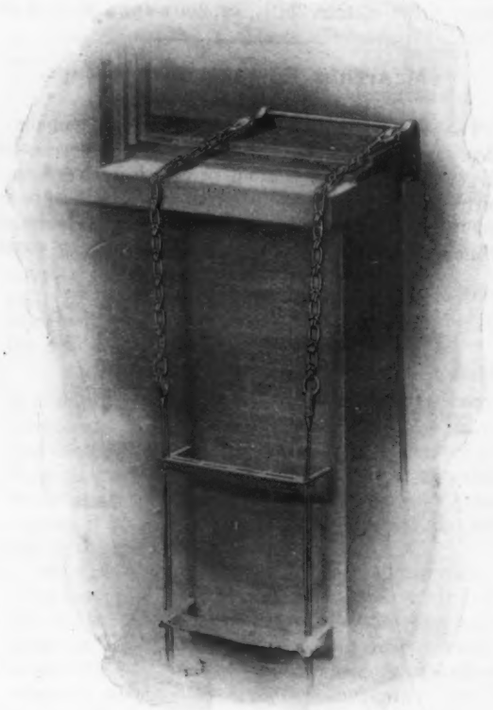


Fig. 3.—Sectional View of Window with Fire Escape in Position.

fastened with round head brass bolts. Another and lighter style of step has a plain surface and single web for a much lighter ladder, the step weighing but 6¼ ounces, and having a tensile strength of 1200 lb. The step used for the travelers' portable fire escape to carry in baggage is 8¾ in. wide, weighs but 2¾ ounces each, and will bear a strain of 840 lb. Fig. 3 illustrates part of a window and the ladder suspended ready for use, the distance from inner clamp to top of first step being 28 in., allowing adequate space for the chain to hang over window sill. The steel wire Triumph chain is made of 5-32 in. wire, galvanized, connecting with the wire rope by means of flexible bronze metal joints, there being a ½-in. hollow nickeled rod to keep the sides together. Fig. 4 is a view of the ladder rolled up with the bottom portion on inner side of coil, so that in an instant, by engaging the clamps on window sill, the bundle can be thrown out of the window, unfolding as it descends. Among other styles of hooks to support the ladder is one for use on vessels of various kinds for going over the side, while another is in two parts for house use. In the latter a portion is screwed permanently to inner side of sill, having two projecting lugs onto which the other part attached to ladder chain slips, and which is

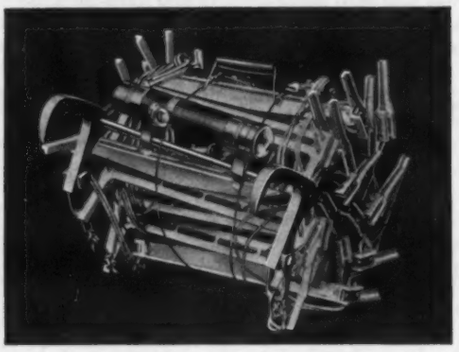


Fig. 4.—Ladder Rolled Up Ready for Use or Storing.

held securely by two pins on each side, so attached as always to be ready for quick use. The salient features of this fire escape, as referred to by the company, are that it is fireproof, will neither tangle, kink, swing or corrode, is of light weight, is accessible from as many floors as there are windows in line of the fall of the ladder, and can be quickly put in service or stored away. It can be made in any length desired or furnished in sections, which may be locked securely in an instant to form one long ladder. If so ordered, a portable electric lamp, shown in Fig. 4, can be furnished with the ladder and attached to it, so that a light is always available by pressing a button. The extreme lightness of the aluminum steps and wire cables make a bundle which in the ordinary or heavier style, weighs but 18 lb. to a 25 ft. length.

Invisible Roll Wire Screen.

The Invisible Roll Screen Company, 446-456 Adelphi street, Brooklyn, N. Y., offers the Invisible roll wire window screen, here shown. It is installed on the inside of the window, being applied to the stop beads by four screws, as in Fig. 1, which illustrates the screen complete, with wire cloth out of sight. Regularly the frame is of Bessemer sheet steel, and in special construction can be of brass, copper or bronze, according to specification. The steel frame is usually enameled in various colors to match inside trim, the finer metals having polished or dull finishes. In operation the screen rolls up and down, and in rolling down the wire cloth is rolled in a case but 1¼ in. in diameter, adjusted on the window sill. The side guides applied to the stop beads are 1¼ in. wide. The mechanical construction of the screen is as follows: In the case, upon which the wire cloth is rolled, is placed a steel tape, upon either end of which brass drums are attached. The steel tape is passed over and around the idler carriers at top of guides, making a circuit of the drums attached to the steel tape, thereby forming practically a continuous steel tape, which in action permits the screen to automatically stop at any desired point and without using springs. In raising or lowering the window sash this

screen can be adjusted to simultaneously follow the bottom rail and to cover any desired opening, the screen operating entirely independent of the window sash, except as the screen follows the movement of the sash when so attached to it. It is noiseless in operation, does not deface woodwork in installation, and owing to its metal construction will not bind or stick. The screen may remain in the window frame all the time and is always ready for use. The entire window can be screened by duplicating the installation at the top, in inverse order, rolling from top downward and from the bottom upward,

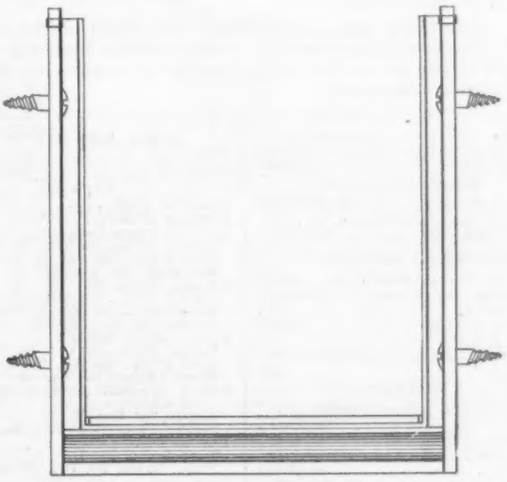


Fig. 1.—Invisible Roll Wire Window Screen, Complete.

or either sash can be covered singly. In general housework Pompeian bronze wire cloth, rustless, 14 mesh, is used, and in railroad cars brass wire cloth of 130 mesh, the latter having 16,900 square openings to the square inch, as against 196 in the 14 mesh. In case of injury or accident the screen cloth can be easily renewed, but it will not rust or corrode. This mechanical construction is also being used for rolling the window curtain cloth in railroad cars, and it is the intention to apply this constructive principle to the rolling of transparent sheet celluloid, in connection with automobiles, which provides a durable, glass-like protection without the perishability or danger of flying glass in the event of fracture from any cause. This style of screen can be used also on casement windows, whether opening inwardly or outwardly, the screen being installed on the opposite side from which the window is opened. The inconspicuous frame work, in special construction, can be supplied in sheet brass, copper or bronze, in polished or dull finishes. In an illustrated descriptive booklet, issued by the company, six combinations of window screen installations are

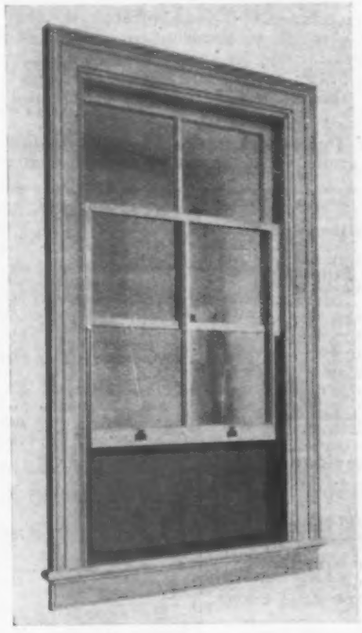


Fig. 2.—Screen as Applied to Lower Half of Window.

shown as applying to regular upper and lower sash windows. Some of the advantages claimed for this screen by the company are its convenience, noiselessness and easy operation, that it rolls out of sight, is not between the eye and window pane, that the annual expense for removal and installation of screens is eliminated, and that the frame serves as a window strip, a weather strip being furnished for the meeting rail. Its durability and rustless character, positive motion and noninterference with the cleaning of windows are also mentioned.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal	
Linseed, City, raw	42	@43
City, Boiled	43	@44
State and Western, raw	40	@41
Raw Calcutta, in bbls		@70
Lard, Extra Prime, Winter	79	@80
Extra No. 1	51	@62
No. 1	45	@46
Cotton-seed, Crude, f.o.b. mills	39½	@41
Summer Yellow, Prime	46	@49
Summer White		@54
Yellow Winter		@53½
Sperm, Crude	59	@60
Natural Winter	72	@73
Bleached Winter	75	@76
Bleached Winter, Extra		@..
Tallow, Prime	60	@61
Whale, Crude	35	@36
Natural Winter	46	@47
Bleached Winter	48	@49
Extra Bleached Winter	50	@51
Menhaden, Brown, Strained	32	@33
Light Strained	32	@33
Northern		@..
Southern		@..
Cocoanut, Ceylon ℔ lb	9¾	@..
Cochin ℔ lb	..	@10¾
Cod, Domestic, Prime	33	@34
Newfoundland	36	@40
Red, Elaine	47	@49
Saponified ℔ lb	6¾	@ 7
Olive, Italian, bbls., Yellow	75	@80
Neatsfoot, Prime	56	@57
Palm, Logos ℔ lb	7⅛	@ 7½

Mineral Oils—

Black, 29 gravity, 25@30 cold test ℔ gal.	11	@12
29 gravity, 15 cold test	12	@13
Summer	11	@12
Cylinder, light filtered	18½	@19½
Dark, filtered	16½	@17½
Paraffine, 903-907 gravity	14	@14½
903 gravity	13	@13½
883 gravity	10¾	@11¼
Red	13	@14½

Miscellaneous—

Barytes:		
White, Foreign ℔ ton	$18.50	@20.50
Amer. floated ℔ ton	19.00	@20.00
Off color ℔ ton	13.00	@16.50
Chalk, in bulk ℔ ton	3.00	@ 3.25
In bbls. ℔ 100 lb	..	@ .35
China Clay, Imported ℔ ton	11.00	@17.50
Cobalt, Oxide ℔ 100 lb	2.50	@ 2.60
Whiting, Commercial ℔ 100 lb	.43	@ .52
Gilders ℔ 100 lb	.55	@ .65
Ex. Gilders ℔ 100 lb	.60	@65

Putty, Commercial—℔ 100 lb

In bladders	$1.70	@1.85
In bbls. or tubs	1.30	@1.45
In 1 lb to 5 lb cans	2.65	@2.95
In 12½ to 50 lb cans	1.50	@1.90

Spirits Turpentine—℔ gal.

In Oil bbls	76	@76½
In machine bbls	76½	@77

Glue—

	℔ lb	
Cabinet	12	@15
Common Bone	7½	@ 9
Extra White	18	@24
Foot Stock, White	13	@14
Foot Stock, Brown	9	@11
German Hide	12	@18
French	10	@40
Irish	13	@16
Low Grade	10	@12
Medium White	14	@17

Gum Shellac—

	℔ lb	
Bleached Commercial	46	@48
Bones, Dried	58	@..
Button	40	@50
Diamond I	59	@60
Fine Orange	56	@57
A. C. Garnet	44	@46
Kala Button	37	@38
D. C	52	@..
Octagon B		@54
T. N	47	@48
V. S. O	59	@60

Colors in Oil—

	℔ lb	
Black, Lampblack	12	@14
Blue, Chinese	36	@46
Blue, Prussian	32	@36
Blue, Ultramarine	13	@16
Brown, Vandyke	11	@14
Green, Chrome	12	@16
Green, Paris		@24
Sienna, Raw	12	@15
Sienna, Burnt	12	@15
Umber, Raw	11	@14
Umber, Burnt	11	@14

White Lead, Zinc, &c.—

	℔ lb	
Lead, English white, in Oil	9⅝	@10
Lead, American White:		
Lots of 500 lb or over, in Oil		@ 7½
Lots less than 500 lb, in Oil		@ 8
Lead, White, in oil, 25 lb tin pails, add to keg price	..	@ ⅛
Lead, White, in oil, 12½ lb tin pails, add to keg price	..	@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price	..	@ 1½

Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.

	℔ lb	
Zinc, American, dry	5¾	@ 5¾
Zinc, French:		
Antwerp, Red Seal, dry	8¾	
Antwerp, Green Seal, dry	10¾	
Paris, Red Seal, dry	9¼	
Paris, Green Seal, dry	11	

Zinc, V. M. French, in Poppy Oil:
Green Seal:
Lots of 1 ton and over.....13½@13⅝
Lots of less than 1 ton.....13¾@13¾
Zinc, V. M. French, in Poppy Oil:
Red Seal:
Lots of 1 ton and over.....11⅞@12¼
Lots of less than 1 ton.....12⅛@12⅝
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%: 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	℔ lb	
Black, Carbon	6½	@10
Black Drop, American	4	@ 6
Black Drop, English	5	@15
Black, Ivory	16	@20
Lamp, Com	4	@ 6
Blue, Celestial	4	@ 6
Blue, Chinese	30	@33
Blue, Prussian	28	@32
Blue, Ultramarine	4½	@15
Brown, Spanish	½	@ 1
Carmine, No. 40	$3.10	@3.25
Green, Chrome, ordinary	3½	@ 7
Green, Chrome, pure	17	@25
Lead, Red, bbls., ⅛ bbls., kegs		@ 7¾
Litharge, bbls., ½ bls., kegs		@ 7¾
Ocher, American ℔ ton	$8.50	@16.00
American Golden	2½	@ 3½
French	1¼	@ 2
Foreign Golden	3	@ 4
Orange Mineral, English	10	@12
French	10¾	@12
German	8½	@10
American	8½	@ 8¾
Red, Indian, English	4½	@ 6
American	3	@ 3¼
Red, Turkey, English	4	@10
Red, Tuscan, English	7	@10
Red, Venetian, Amer. ℔ 100 lb	$0.50	@1.25
English ℔ 100 lb	$1.15	@1.75
Sienna, Italian, Burnt and Powdered	3	@ 9½
Italian, Raw, Powdered	3	@ 7
American, Raw	1½	@ 2
American Burnt and Pow'd	1½	@ 2
Talc, French ℔ ton	$17.00	@25.00
American ℔ ton	15.00	@25.00
Terra Alba, French ℔ 100 lb	.90	@ 1.00
English ℔ 100 lb	.80	@ 1.00
American ℔ 100 lb, No. 1	.75	@ .80
American ℔ 100 lb, No. 2	.60	@ .65
Umber, T'key, Bnt. & Pow	2¼	@ 3½
Turkey, Raw and Powdered	2¼	@ 3½
Burnt, American	1½	@ 2
Raw, American	1½	@ 2
Yellow Chrome	13	@15
Vermilion, American Lead	10	@25
Quicksilver, bulk	65	@..
Quicksilver, bags		@68
English, Imported	65	@70
Chinese	$0.90	@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, ₩ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anti—Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ₩ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₩ doz. pairs .....$2.00@$3.00

Anvils—American—

Eagle Anvils.....₩ lb @8½¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....₩ lb 9½@9¾¢

Imported—

Peter Wright & Sons, ₩ lb, 84 to 349 lb. 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Livingston Nail Co.....33⅓%

Augers and Bits—

Com. Double Spur.....70%
Jennings' Pats., reg. finish.....60&5@60&10%
Black Lip or Blued...65@65&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list..25%
No. 50, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....40%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ₩ doz. $26; No. 2, $18.....60&10&10%
Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10&10%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—

Bonney Pat., per doz...$5.50@6.00
Ames .....25&10%
Universal 20%
Wood's Universal.....25%

Ship Augers and Bits—

Ship Augers.....40&10%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—

Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—

See *Grease, Axle*

Axles—*Iron or Steel*

Concord, Loose Collar..4½@5 ¢
Concord, Solid Collar..4¾@5¼¢
No. 1 Common, Loose..3½@4 ¢
*No. 1¼ Com., New Style*3¾@4¼¢
No. 2 Solid Collar.....3¾@4¼¢
Half Patent:
Nos. 7, 8, 11 and 12....70@75%
Nos. 13 to 14.....70@75%
Nos. 15 to 18.....75@75&5%
Nos. 19 to 22.....75@75&5%

Boxes, Axle—

Common and Concord, not turned lb., 4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....*lb.*, 9½@10¢

Bait—Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances—Sash—

Caldwell new list.....50%
Pullman .....50&10@60%

Spring—

Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50@50&10%
Straight Balances.....40@40&10%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 40 lb.... per lb., 3@3½¢

Towel—

No. 10 Ideal, Nickel Plate..₩ gro. $8.50

Beams, Scale—

Scale Beams.....40%
Chattilon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₩ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ₩ doz. $1.15; Tinned .....
No. 10 Wire Tinned.....₩ doz. $1.55
Western W. G. Co.:
No. 1 Electric.....₩ gro. $7.80
No. 2 Buffalo.....₩ gro. $9.00
No. 3 Perfection Dust.....₩ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65, Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....$6.00
Western, W. G. Co., ₩ gro., Buffalo, No. 2, $8.00; Perfection, No. 3, $8.00.
Wonder (R. M. Co.)..₩ gro. net, $6.25

Bellows—

Blacksmith, Standard List..
Split Leather.....65%
Grain Leather.....60%

Hand—

Inch..	6	7	8	9	10	Net Prices.
Doz...	$5.50	6.15	6.60	7.15	7.70	

Molders—

Inch..	9	10	11	12	14	Net Prices.
Doz...	$8.00	9.00	10.50	12.50	14.50	

Bells—Cow—

Ordinary Goods...75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....50%

Door—

Abbe's Gong.....40@40&10%
Barton Gong.....50%
Home, R. & E. Mfg. Co.'s.....5&10%
Trip Gong.....50@50&10%
Yankee Gong.....40&10@50%

Hand—

Polished, Brass.....60@60&5%
White Metal...50&10@50&10&5%
Nickel Plated.....50@50&10%
Swiss .....50&10@50&10&5%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....25@30%

Miscellaneous—

Farm Bells.....*lb.*, 2¼@2½¢
Church and School.....60%
Table Call Bells.....50@50&10%

Belting—Leather—

Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard.....70%
Light Standard.....70&5%
Cut Leather Lacing.....45%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade)..... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops—

See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.
Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list: Chain, Parts, Spokes.....50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—Tackle—

Common Wooden.....75%
Hartz St. Tackle Blocks.....50@50&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Loading.....50&10%
See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c.....40%
Paper Embossed.....40&10%

Boards, Wash—

See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co.....30⅓%

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅝ × 6 and smaller..70&12½@—%
Larger and Longer..60&2½@—%
Phila. Eagle $3.00 list May 21, '99 40%
Bolt Ends.....65@65&5%
Machine, ¾ x 4 and smaller.. 70&12½@—%
Machine, larger and longer.. 60&7½@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:

Inch.....	3	4	5	6	8
Per doz.(.)	.30	.35	.45	.60	.80

Cast Iron Spring Foot, Jap'd:

Inch.....	6	8	10
Per doz.....	$1.20	1.50	2.25

Cast Iron Chain, Flat, Japanned:

Inch.....	6	8	10
Per doz.....	$1.00	1.40	1.85

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch.....	6	8	10
Per doz.....	$0.75	.95	1.25

Wrought Barrel Japd...80@80&10%
Barrel Bronzed.....60&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square .....70&10@70&10%
Ives' Patent Door 50%

Plow and Stove—

Plow .....65&10@—%
Stove .....85@85&10%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Mount Carmel, list Dec. 28, '99...80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila. Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch.....	1⅛	1½	1⅝	2
Per doz...	$4.80	5.60	6.40	8.00
Inch	2¼	2½		
Per doz.....	$5.65	11.50		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%
Perfection 40%
Seavey 40%
Stanley R. & L. Co.: Nos. 240 to 460, 30%; Nos. 50 and 60.....35%

Braces—

Common Ball, American..$1.25@1.30
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, $1 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P. S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley, 35%; Victor.....45%

Brackets—

Wrought Steel.....80@80&5%
Griffin's Pressed Steel.....75&10@80%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf, 75%; Sink...50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....60%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—

M'f'gr's list, price per gross.

Quart..	10	12	14	10&5%
Water, Reg...	25.35	28.00	32.00	
Water, Hvy...	45.35	48.00	52.00	
Fire, Rd. Btm.	32.00	34.65	38.65	
Well	37.35	41.35	45.35	

Bucks, Saw—

Hoosier.....₩ gro. $36.00

Bull Rings—See *Rings, Bull*

Butts—Brass—

Wrought, High List, Oct. 26, '06. 45%
Cast Brass, Tiebout's.....40%

Cast Iron—

Fast Joint, Broad....40&10&50%
Fast Joint, Narrow...40&10&50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—*Discount.*

Reversible and Broad..75%
Light Reversible, Light Narrow 75%
Loose Joint, Narrow, L't
Inside Blind, etc..70&10%
Back Flaps, Table, Chest 70%

Net Prices.

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, 10%; 1200, 25%; 200, 300, 600, 900 .....40%

Hendryx Bronze; Series 700, 800..40%
Hendryx Enameled.....w/s

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong.....per lb., 4@4¼¢
Sharp, 1 prong...per lb., 4½@4¾¢
Burke's Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Gautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Can Openers—
See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.05 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$18.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's E. B.....55@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—

Berdan Primers, $2 per M..20&5%
Primer Shells and Bullets..15&10%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Smgd..$1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½	9-16
$8.77	6.17	5.02	4.57	4.37	4.27	4.22
⅝	¾	⅞ to 1	1⅛ to 1¼ inch.			
$4.17	4.07	4.02	4.12			

In cask lots, deduct 25¢.
German Coil.....60&10&10@70%

Halter—

Halter Chains.....60@60&5%
German Pattern Halter Chains, list July 24, '97.....60&10&5%
Covert Mfg. Co.
Halter.....35&5%

Cow Ties—
See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring..$27.00
6½—6-2, Straight, with ring..$28.06
6½—8-2, Straight, with ring..$32.00
6½—10-2, Straight, with ring..$37.00

NOTE.—Add 2c per pair for Hooks. Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon Chain, &c.....60&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60&10%
Brass.....50&10%
Safety and Plumbers' Chain, 60&10%
Gal. Pump Chain.....lb. 4@4½¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion.....40%
Oneida Community:
American Halter, Dog and Kennel Chains.....35&2½@40%
Niagara Dog Leads and Kennel Chains.....45@60&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set..8¢

Chalk—(From Jobbers.)

Carpenters' Blue....gro., 50@55¢
Carpenters' Red.....gro., 45@50¢
Carpenters' White...gro., 40@45¢

Checks, Door—

Bardsley's.....45%
Pullman, per gro.....$54.00
Russwin.....33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters,' etc., Chests, with Tools.....25%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—

Socket Framing and Firmer

Standard List.....70&10@75%
Buck Bros.....30%
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....66⅔&70%
L. & I. J. White Co.....30@30&5%

Tanged—

Tanged Firmers.....30&5@35%
Buck Bros.....30%
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold—

lb.
Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary...9@10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each $8.00.....35&5%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%; Standard, 40&10%; Skinner Pat. 25%; Positive Drive.....40%
Planer Chucks.....30%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and 84.....30%
Geared Scroll, Nos. 33, 34 and 35..30%
Independent Iron, Nos. 18 and 318..35%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill.....25%
Universal 11, 12, 16, 17, 13, 14, 15..35%
Universal, No. 42.....30%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72.....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co.....40&10@50%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel..℔ doz. $4.05 net
Star Shank, All Steel..℔ doz. $3.24 net
W. & C. Shank, All Steel, ℔ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$6.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} N & R

Clips, Axle—

Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.....60&10@65%
Compression Bibbs...55&10@60%

Coffee Mills—
See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%
Wm. Schollhorn Co.:
Excelsior Dividers.....55%
Lodi Dividers.....75%

Conductor Pipe,—

L. C. L. to Dealers:

	Galvanized		
	Galv. Steel.	Charcoal Iron.	Copper. 14, 16&20 oz.
Eastern:			
	70%	50&7½%	30%
Central:			
	65&10%	55&2½%	20&10%
Western and Southern:			
	65&5%	50&7½%	20&7½%
So. Western			
	50&25&2½%	50%	20&5%

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each..	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4	6	8	
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles, Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15
White Enameled, 25%; Agate Lined.25%					

Coopers' Tools—
See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 32@35¢; lighter than 3 lb. to pair.....34@37¢

Cord—Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 26¢; No. 7, 26½¢; No. 6, 27½¢.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....lb., 11@11½¢
Cotton Sash Cord, Tw'ted.18@20¢
Patent Russia.....lb...20¢
Cable Laid Russia.....lb...21¢
India Hemp, Br'd'd.....lb...21¢
India Hemp, Twisted..lb.13@14¢
Patent India, Twisted...lb...17¢
Anniston Cordage Co.: ℔ lb, solid Braided, Nos. 8 to 12, $0.24; No. 7, $0.24½; No. 6, $0.25½; ℔ doz., 50 ft., Oriole, $2.00; 50 ft., Columbia, $0.85; 50 ft., Victors, $1.00; 50 ft., 6-Thread, $1.10; 60 ft., 3-Thread, $0.95; 50 ft., Manila, $1.40; 60 ft., Jute, $0.75.
Pearl Braided, cotton, No. 6, ℔ lb, 27½¢; No. 7, 26½¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½¢; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....℔ lb 23 ¢
Pullman:
Wire Sash Cord.....18%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White....℔ lb 40¢
Massachusetts, Drab.....℔ lb 45¢
Phoenix, White, Nos. 8 to 12, 27¢;
} 15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....37½¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906...85&10&10@—
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co. Wire Picture Cord.....90%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber.....℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.00
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $16.25; Indelibles.....$18.75
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ⅛ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $7.00; Light.....$6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847.℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....℔ doz. $3.00
Wm. Rogers & Son.....℔ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	401	402	403	404	405	406	407
Each	$5	$7	$10	$12	$25	$50	$80

Enterprise:

Nos.	5	10	12	22	32	
Each	$2	$3	$2.75	$4.50	$6	25@25&7½%

No. 202, $1.50.....40&7½%
Dixon's.....℔ doz. 30@30&5%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40@40&5%
Little Giant.....℔ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, ℔ doz. $24.00.....40@50%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....℔ doz. 30@30&5%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater.....℔ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..℔ gr. $18@$20
Slaw Cutters, 2 Knife..℔ gr. $22@$30

Tobacco—

All Iron, Cheap..doz. $1.25@$1.50
Enterprise.....25@30%
National, ℔ doz., No. 1, $21; No. 2, $18.....40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, ℔ doz., $24.00.....25%
Samson, ℔ doz., $34.00.....25%
Iwan's Imp'ved Post Hole Auger.40&5%
Vaughan Pattern Post Hole Augers, ℔ doz., $6.25
Perfection Post Hole Diggers, ℔ doz.....$8.75
Split Handle Post Hole Diggers, ℔ doz., $7.75
Kohler's, ℔ doz., Universal, $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.00; Pioneer.....$7.00
Never-Break Post Hole Diggers, ℔ doz., $24.00.....60%

Dividers—See *Compasses.*

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ℔ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—
See *Knives, Drawing.*

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills.50&10@60&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 912.....40%
Ratchet, Celebrated.....40%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 19, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank.....60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2¼-in., $6; 4-in., $7.50; 6-in., ℔.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Disston's.....70%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, Nos. 29 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
New England Specialty Co.....30%
Smith & Hemenway Co.....Neverturn, 40&5%; Elmora.....50%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles, 80&10%; No. 86, 70%; Defiance, 70%; Hurwood, 55%.
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized*		
	Galv. Steel.	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*
Eastern:			
	70&30%	70%	30%
Central:			
	75&10&2½%	65&10%	20&10%
Western and Southern:			
	75&7½%	65%	20&7½%
So. Western:			
	75%	60&10%	20&5%

Terms.—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I.
Standard Gauge.....80%
No. 26.....m/s
No. 24.....25%
No. 22.....m/s
Copper.....40&10%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40&10&10%
Edwards, Royal Blue.....40&10&10%
Dover, one piece (R. M. Co.).....40&10%
Perfect Elbows.....40%

Emery, Turkish—

	¼ to ½:	⅝ to 220:	Flour.
Kegs.....lb.	5 ¢	5½¢	3½¢
½ Kegs.....lb.	5¼¢	5¾¢	3¾¢
¼ Kegs.....lb.	5½¢	6 ¢	4 ¢
10-lb. cans, 10 in case....	6¼¢	7 ¢	6 ¢
10-lb. cans, less than 10.....	10 ¢	10 ¢	8 ¢
Less quantity..	10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice

Fasteners, Blind—See *Squeezers, Lemon.*

Zimmerman's ..... 50&10%
Walling's ..... 40&10%

Cord and Weight—

Ives 33⅓%

Faucets—

Cork Lined ..... 50@50&10%
Metallic Key, Leather Lined .. 60&10@70%
Red Cedar ..... 40&10@50%
Petroleum ..... 70&10@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60%
West Lock ..... 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Mtl. Key ..... 50&10%
John Sommer's Duplex Metal Key 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined 50%
John Sommer's Reliable Cork Lined .. 50&10%
John Sommer's Chicago Cork Lined 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection, Cedar 40%
McKenna, Brass:
Burglar Proof, N. P. 25%
Improved, ¾ and ⅞ inch 25%
Self Measuring:
Enterprise, ℔ doz. $36.00 ..... 40&10%
Lane's, ℔ doz. $36.00 ..... 40&10%
National Measuring, ℔ doz. $36 .. 40&10%

Felloe Plates—

See *Plates, Felloe.*

Files— Domestic—

List Nov. 1, 1899.
Best Brands ..... 70&10@75&10%
Standard Brands .. 75&10@75&10&10%
Lower Grade .... 75&10&10@80&10%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 ..... 35 1-3@40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 ..... $3.75
Fusible Links, No. 96 ..... 50%
Expansion Bolts, No. 107 ..... 60&10%

Grindstone—

Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	$3.25	3.75	4.25	4.75

P., S. & W. Co. ..... 50&10%
Reading Hardware Co. 60%
Stowell's Giant Grindstone Hanger .. ℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy, 40&10%; Light 50%

Fodder Squeezers—

See *Compressors.*

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato ..... 60&10%
Victor, Hay ..... 60&15&2½%
Victor, Manure 66⅔%
Victor, Header 65%
Champion, Hay 66⅔%
Champion, Header 65%
Champion, Manure ..... 60&15&2½%
Columbia, Hay ..... 60&20%
Columbia, Manure 70%
Columbia, Spading ..... 70&12½%
Hawkeye Wood Barley 40%
W. & C. Potato Digger ..... 60&10%
Acme Hay ..... 60&20%
Acme Manure, 4 tine ..... 60&10&5%
Dakota Header ..... 60&20%
Jackson Steel Barley ..... 60&20%
Kansas Header 65%
W. & C. Favorite Wood Barley 40%
Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz. .75@80¢
Red, S'g't Bar, per doz. .$1.00@1.25
Red, Dbl. Brace, per doz. $1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	$1.30	$1.60	$1.90	$2.20	$2.80

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*

Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped .. 3.65
Waterproof Dbl. Taped .. 4.40
Waterproof Tpl. Taped .. 5.15
10&2½%

Gates, Molasses and Oil—

Stebbins' Pattern ..... 80&10%

Gauges—

Marking, Mortise, &c. .50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c. ..... 50&50&10%
Disston's Marking, Mortise, &c. .. 67½%
Stanley R. & L. Co.'s Butt and Rabbet Gauge 35%
Marking and Mortise 55%
Wire, Brown & Sharpe's 33⅓%
Wire, Morse's 25%
Wire, P., S. & W. Co. 30%

Gimlets— Single Cut—

Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.50; 2, $4.60

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co. ..... 65@65&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush .. 25&10@50%
International Glue Co. (Martin's) .. 40%

Grease, Axle—

Common Grade .... *gro.* $4.50@6.00
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ℔ doz., 1 lb. $1.20; 2 lb. $2.00
Helmet Hard Oil 25%

Griddles, Soapstone—

Pike Mfg. Co. ..... 33⅓@33⅓&10%

Grindstones—

Pike Mfg. Co.:
Improved Family Grindstones, ℔ inch, ℔ doz., $2.00 ..... 33⅓%
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 ..... 30%
Alundum Sickle Grinders, each, Nos. 20A, $6.00; 20A Combined, $6.50 ..... 30%
Alundum Disc Grinders, each, $2.50 ..... 30%

Grips, Nipple—

Perfect Nipple Grips ..... 40&10&2%

Halters and Ties—

Cow Ties ..... 60&5@60&10%
Covert Mfg. Co.:
Web ..... 30&2%
Jute Rope 35%
Sisal Rope 20%
Cotton Rope 45%
Hemp Rope 45%
Oneida Community:
Am. Coil and Halters ..... 40@40&5%
Am. Cow Ties ..... 45@50%
Niagara Coil and Halters .. 45@50&5%
Niagara Cow Ties .... 45&5@50&10&5%

Hammers—

Handled Hammers—

Heller's Machinists' ... 55&10@55&10&5%
Heller's Farriers' ..... 40&5@40&10&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 ..... 50%
Peck, Stow & Wilcox, Steel 50%
Fayette R. Plumb:
A. E. Nail ..... 40&2½@40&12½%
Eng. and B. S. Hand .... 50&12½@60%
Machinists' Hammers .... 50&15@60&5%
Rivet and Tinners' ... 40&2½@40&12½%

Heavy Hammers and Sledges—

Under 3 lb., per lb. 50¢.80&5@ .. %
3 to 5 lb., per lb. 40¢.80&5@ .. %
Over 5 lb., per lb. 80¢ .... 80&10&5@ .. %
Wilkinson's Smiths' .. lb. 9½@10¢

Handles—

Agricultural Tool Handles

Axe, Pick, &c. .... 60&10@60&10&5%
Hoe, Rake, &c. ..... 40@45&5%
Fork, Shovel, Spade, &c.:
Long Handles ..... 40@45&5%
D Handles 40%

Cross-Cut Saw Handles—

Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—

Auger, assorted ... *gro.* $2.50@$3.00
Brad Awl ..... *gro.* $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; *Hickory* ..... $2.15@2.40
Socket Firming, Apple, $1.75@ $1.95; *Hickory* ..... $1.45@$1.60
Socket Framing, Hickory, $1.60@$1.75
File, assorted ..... *gro.* $1.30@$1.40
Hammer, Hatchet, &c. .. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80@85¢; *Not Varnished* ... 65@75¢
Plane Handles:
Jack, doz. 30¢; *Jack, Bolted* .75¢
Fore, doz. 45¢; *Fore, Bolted* .90¢
Chapin-Stephens Co.:
Carving Tool ..... 40@40&10%
Chisel ..... 65@65&10%
File and Awl ..... 65@65&10%
Saw and Plane ..... 40@40&10%
Screw Driver ..... 40@40&10%
Millers Falls Adj. and Ratchet Auger Handles ..... 20&10%
Nicholson Simplicity File Handle .... ℔ gro. $0.85@$1.50

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.

Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door 50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle ..... 60&10%
Roller Bearing 70%
Griffin Mfg. Co.:
Solid Axle, No. 19, $12.00 ..... 70%
Roller Bearing, No. 11, $15.00 .. 70%
Roller Bearing, Ex. Hy., No. 22, $18.00 ..... 70%
Hinged Hangers, $16.00 .... 60&10%
Lane Bros. Co.:
Parlor, Ball Bearing, $1.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard ..... 60&5%
Hinged ..... net $6.08
Covered ..... 60&2%
Special ..... 70&5%
Lawrence Bros.:
Advance and Sterling .... 60&2½%
Cleveland and Peerless .. 70&7½%
Clipper, No. 75 ..... 60&5%
Crown ..... 60&2½%
Cyclone-Tandem ..... net $7.50
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant 60%
Hummer ..... 70&7½%
New Cyclone, Flexible, $16.00 60
New York ..... 60&2½%
McKinney Mfg. Co.:
No. 1, Special, $15 ..... 60&10%
No. 2, Standard, $18 ..... 60&10%
Hinged Hangers, $16 ..... 50%
Meyers' Stayon Hangers ..... 60&5%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3 .. $2.25
Roller B'r'g St'l Track No. 12 .. $2.20
Roller B'r'g St'l Track No. 13 .. $2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19 .. 50&10%
Adjustable Track Tandem Trolley Track No. 16 ..... 50&10%
Seal, Steel Track No. 8 ..... $2.25
Auto Adj. Track No. 22 .—50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150 ..... $2.50
Safety Underwriters F. D. No. 101 ..... 50%
Tandem No. 44, 2¼ and 3 .. 60&10%
Palace, Adjustable Track No. 122 ..... 50&5%
Royal, Adjustable Track No. 122 ..... 50&10%
Ives' Wood Track No. 1 ..... $2.25
Trolley B. D. No. 20 ..... 50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28 ..... $1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2 .. 70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3 ..... 60%
Hinged Tandem No. 48 .... 60&5%
Folding Door B. B. Swivel No. 138 ..... 40%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing 30%
Ajax Hinge Door 60%
Apex Parlor Door ..... 50&10&5%
Atlas 60%
Baggage Car Door 50%
Climax Anti-Friction 50%
Elevator 40%
Express 50%
Lundy Parlor Door 50%
Matchless 60%
Nansen 70%
Parlor Door, 50&10%; Railroad, 50&10%
Steel, Nos. 300, 404, 500 ..... 50%
Underwriters' Fire Door 40%
Wild West Warehouse Door .. 50%
Wilbern, No. 0, net, ℔ doz. $9.00
Zenith for Wood Track 50%
A. L. Sweet Iron Works:
Check Back, 70%; Eagle 70%
Climax Anti-Friction ..... 50&10%
Hylo Hinge, New Perfection, Pilot, Pilot Hinge 60%
Rider Wooster 65%
Western Pattern 70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing .. 50&15&10&5%

Extra 5&10% often given.

Hangers— Garment—

Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.50; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $10.50; Garment Hanger Loops, Round Nickeled, per gro. $10.50
Victor Folding ..... ℔ gro. $9.60
Western, W. G. Co. ..... 75&10%

Gate—

Myers' Patent Gate Hangers, ℔ doz. net $4.50

Joist and Timber—

Lane Bros. Co. 30%

Hasps—

Griffin's Security Hasp ..... 50&10%
McKinney's Perfect Hasp, ℔ doz. .. 50%

Hatchets—

Regular list, first qual. .40&7½%—
Second quality ..... 50&10%—

Heaters, Carriage—

Clark, No. 5, $1.75; No. 5B, $2.00; No. 1, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50 ..... 25%
Clark Coal, ℔ doz., $0.75 ..... 20%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	$0.75	1.35	2.70

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	$0.70	.65	.60	.55

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	$0.70	.65	.60

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Charles Parker Co. ..... 70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00 ..... 20%
Reading's Gravity 60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ℔ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter ..... 70&10&2½%
Acme, Lull & Porter ..... 70&5&2½%
Queen City Reversible ..... 70&5&2½%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 70&10&2½%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 10&10&2½%
1868, Old Pat'n, No. 1 ..... 75%
Nos. 3 & 5 ..... 70&10&2½%
Tip Pat'n, No. 1 ..... 75%
No. 3 ..... 70&10&2½%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 70&5%
Shepard's Double Locking .. 70&5&2½%
Champion Gravity Locking ..... 70&10&2½%
Pioneer 75%
Empire 60%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60%

Extra 10% often given on most of these Hinges.

Gate Hinges—

Clark's or Shepard's—Doz. sets:			
No.	*1*	*2*	*3*
Hinges with L't'chs.	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	.85

New England:
With Latch ..... *doz.* ....@$2.00
Without Latch ..... *doz.* ....@$1.60
Reversible Self-Closing:
With Latch ..... *doz.* ....@$1.75
Without Latch ... *doz.* ....@$1.35
Western:
With Latch ..... *doz.* $1.75
Without Latch ..... *doz.* $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3 ..... 65&5%

Pivot Hinges

Bommer Bros. Pivot 40%
Lawson Mfg. Co. Matchless 50%

Spring Hinges—

Holdback, Cast Iron ... $6.50@$7.00
Non-Holdback, Cast Iron $6.25@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges 40%
Bardsley's Patent Checking .. 33⅓%
Bommer Bros.:
Bommer Ball Bearing Floor .. 40%
Bommer Spring Hinges 40%
No. 999 Wrot. Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor .. 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hardware Co.:
Acme, Wrought Steel 30%
Acme, Brass 25%
American 30%
Columbia, ℔ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ℔ gr. $12.00
Columbian Hinges ..... 60&10%
Gem, new list 30%
Clover Leaf ..... ℔ gr. $12.00
Oxford, new list 30%
Floor Spring Hinges ..... 65&10%
Lawson Mfg. Co., Matchless 30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door ..... ℔ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door 25%
No. 777, Sheet Steel Holdb'k, ℔ gr., pr. $9.00
Superior Spring Hinge Co.:
Superior Floor Hinges 33⅓%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4 ..... ℔ gr. $9.00
New Idea No. 1 ..... ℔ gr. $9.00
New Idea, Double Acting 50%
New Idea Floor 50%

Wrought Iron Hinges—

Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges .. 65%
Heavy Strap Hinges .. 70%
Light T Hinges 60%
Heavy T Hinges 50%
Extra H'y T Hinges .. 66⅔%
Hinge Hasps 45%
Cor. Heavy Strap 70%
Cor. Ex. Heavy T .. 68⅔%
60&10%
Extra 10%

Screw Hook and Strap,
6 to 12 in. .. lb. 5½¢
14 to 20 in. .. lb. 5½¢
22 to 36 in. .. lb. 5½¢

Screw Hook and Eye:
¾ *to 1 inch* ..... lb. 6½¢
⅞ *inch* ..... lb. 7½¢
1½ *inch* ..... lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
M'f'gr's list, price per gross.

Inch	15	16	17	18	10&5%
Galv. Open	$35	$39	$42	$46	
Jap. Open	26	28	31	35	
Galv. Funnel	43	48	52	56	
Jap. Funnel	33	36	39	43	

Masons' Etc.—
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye—
Scovil and Oval Pattern.....60&10@60&10&10%
Grub, list Feb. 23, 1899.....70&10@75&10%
D. & H. Scovil.....30%

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding, No. 1, $2.75; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ℔ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....℔ doz. 66⅔%
Junior Size.....℔ doz. $4.00
Ft. Madison Sprouting Hoe..℔ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....℔ doz., net, $4.35
W. & C. L'ning Shuffle Hoe, ℔doz.$4.85

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders— Bit—
Angular, ℔ doz. $24.00.....45&10%

Door—
Bardsley's, Iron, 40%; Brass and Bronze.....33⅓%
Empire.....50%
Pullman.....35%
Superior.....33⅓%

File and Tool—
Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—
Triumph Fruit Jar Holder, ℔ gross, $10.80; ℔ doz.....$1.25

Trace and Rein—
Fernald Double Trace Holder, ℔ doz. pairs.....$1.25
Dash Rein Holder, ℔ doz. pairs..$1.25

Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—
Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—
Belt.....80%
Wire C. & H. Hooks:.....75@75&10%
Columbian Hdw. Co., Gem.....70&5%
Parker Wire Goods Co., King..70&10%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—
Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....*doz. $1.05@$1.25*
Wrought Staples, Hooks, &c.—See Wrought Goods

Miscellaneous—
Hooks, Bench, see *Stops, Bench. Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25*
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz......*$1.30*
Whiffletree.....*lb. 5¾@6¢*
Hooks and Eyes:
Brass.....60&5@60&10&5%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ℔ doz. $3.25 net
Turner & Stanton Co. Cup and Shoulder.....80&10&10%
Bench Locks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition.....*ft. 5 @ 6 ¢*
3-ply Guaranteed..*ft. 8 @ 9 ¢*
4-ply Guaranteed..*ft. 10 @11 ¢*
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft. 8 @ 9 ¢*
Fair Quality.....*ft. 10 @11 ¢*

Irons— Sad—
From ¼ to 10.....*lb. 3 @3½¢*
B. B. Sad Irons.....*lb. 3¼@3½¢*
Mrs. Potts', cents per set:

Nos.	50	55	60	65
Jap'd Tops	80	77	90	88
Tin'd Tops	85	82	95	92

New England Pressing..*lb. 3¾@4¢*

Pinking—
Pinking Irons.....*doz. 60¢*

Irons, Soldering
See *Copiers.*

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Kettles—
Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—
Wilkinson Shear & Cutlery Co., Wilcut Brand Knives and Hooks.60%
Withington Acme, ℔ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....*75&5@75&10%*
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42....75%
Swan's.....66⅔@70%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—
Serrated Edge, per doz..$5.50@5.75
Iwan's Sickle Edge.....℔ doz. $9.50
Iwan's Serrated.....℔ doz. $10.00

Mincing—
Buffalo.....℔ gro. $13.00

Miscellaneous—
Farriers'.....*doz. $3.00@3.25*
Wostenholm's.....℔ doz. $3.00@3.25

Knobs—
Base, 2½-inch, Birch, or Maple, Rubber Tip.....*gro. $1.25@$1.40*
Carriage, Jap., all sizes.....*gro. 40@45¢*
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..*doz. $2.05@2.15*
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—
See *Belting, Leather—*

Ladders, Store, &c.—
Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—
L. & G. Mfg. Co. (low list).....25%
P. S. & W.....40&10%
Reading.....50%

Lanterns—Tubular—
Regular Tubular, No. 0.....*doz.$4.25@4.50*
Lift Tubular, No. 0.....*doz.$4.75@5.00*
Hinge Tubular, No. 0.....*doz.$4.75@5.00*
Other Styles.....*40@40&5%*

Bull's Eye Police—
No. 1, 2¾-inch.....*$2.75@3.00*
No. 2, 3-inch.....*$3.00@3.25*

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—
Roggin's Latches, with screw.....*doz. 35@40¢*

Door—
Allith Mfg. Co., Automatic, No. 400, ℔ doz.....$4.00
Cronk & Carrier Mfg. Co., No. 101, ℔ doz. $2.00
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50
Stowell's Steel.....50%

Leaders, Cattle—
Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Lifters, Transom—
R. & E.....10%

Lines—
Wire Clothes, Nos. 18 19 20
100 feet.....$2.25 2.00 1.75
75 feet.....*$1.75 1.35 1.10*
Anniston Waterproof Clothes, 50 ft., ℔ gro., $25.00; Gilt Edge, $23.00; Air Line, $23.00; Acme, $18.00; Alabama, $17.00; Empire, $16.00; Advance, $14.00; Eclipse, $13.50; Chicago, $11.50; Standard, $10.50; Columbia, $9.50; Allston, $13.50; Calhoun, $12.00.
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....℔ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft. $5.25.....20%

Locks— Cabinet—
Cabinet Locks.....*$1¼%*

Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Elevator—
Stowell's.....50%

Padlocks—
R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—
Ives' Patent:
Bronze and Brass, 60%; Crescent, 40&20%; Iron, 60%; Window Ventilating, 55%; Robinson Pat. Ventilating Sash Lock, 33⅓%; Wrought Bronze and Brass, 55%; Wrought Steel, 55%.
Pullman Patent Ventilating Lock..35%
Reading.....40%

Machines—Boring—
Com. Upr't, without Augers,.....*$2.00@2.25*
Com. Angl'r, without Augers,.....*$2.25@2.50*
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....33⅓%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—
Reisinger Invincible Hand Power.....℔ doz. $18.00

Fence—
Williams' Fence Machines....each. $5.50

Hoisting—
Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone High Speed Chain Hoist.....25%

Ice Cutting—
Chandler's.....12½%

Washing
Boss Washing Machine Co.: Per doz.
Boss No. 1.....$57.00
Boss Rotary.....$57.00
Champion Rotary Banner No. 1..$57.00
Standard Champion No. 1.....$50.00
Standard Perfection.....$27.00
Cincinnati Square Western.....$33.00
Uneeda American, Round.....$33.60

Mallets—
Hickory.....*45&5@50%*
Lignumvitæ.....*45&5@50%*
Tinners' Hickory and Applewood.....*doz. 45&5@50%*

Mangers, Stable—
Swett Iron Works.....50%

Mashers, Vegetable—
Western, W. G. Co., Potato....60&10%

Mats, Door—
Elastic Steel (W. G. Co.), new list.50%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—
Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Motors Water—
Divine's Red Devil.....30%

Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest.....*all sizes, $1.85@2.00*
Cheap.....*all sizes, $2.00@2.50*
Better Grade..*all sizes, $2.50@4.50*

	12	14	16	18-in.
High Grade	$4.50	4.75	5.00	5.25

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel.....70&10&10%
Style B, Low Wheel.....70&10%
Style C, High Wheel, spcl. disct., 70&10%
Style D, High Wheel, spcl. disct.70%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%
Horse.....40&5%
Pony.....40&5%
36-in. Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—
Wire Nails and Brads, Miscellaneous.....*85&10@85&10&5%*
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Champlain	28	26	25	24	23	.....50%
Coleman	13	12	12	11	11	.....net
New Haven	23	21	20	19	18	...40&5%
Livingston	19	18	17	16	16	.....10%

Western.....℔ lb. 8½¢
Jobbers' Special Brands.....*per lb. 9@10¢*

Picture—

	1½	2	2½	3	in.
Brass H'd	.45	.55	.60	.70	.. gro
Por. Head	..	1.10	1.10	1.10	.. gro

Nippers—
See *Pliers and Nippers.*

Nuts—
Cold Punched: *Off list.*
Square, Blank or Tapped..*4.80¢*
Hexagon, Blank or Tapped..*5.10¢*
Square, Bl'k, C., T. & R...*5.10¢*
Hexagon, Bl'k, C., T. & R..*5.70¢*
Hot Pressed:
Square, Blank.....*5.00¢*
Hexagon, Blank.....*5.40¢*
Square, Tapped.....*4.70¢*
Hexagon, Tapped.....*5.10¢*

Oakum—
Best.....*lb., 6½¢*
U. S. Navy.....*lb., 6¢*
Navy.....*lb., 5¢*
Plumbers' Spun Oakum.....*3⅝¢*
In carload lots ½¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....*50&10%*
Tin or Steel.....*65&10&5@70%*
Zinc.....*65&10&5@70%*
Chase or Paragon:
Brass and Copper.....*50&10%*
Tin or Steel.....*65&10%*
Zinc.....*65&10%*
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70&70&10%
Railroad Oilers, &c.....60@65&10%

Openers— Can— *Per doz.*
Sprague, Iron Handle.....*50@55¢*
Sprague, Wood Handle...*35@40¢*
Sardine Scissors.....*$1.75@$3.00*
Vim Tin Shear and Can Opener, ℔ doz., 75c.; per gro., $7.50
Yankee Can and Bottle Opener, ℔ doz., net.....$0.75

Egg—
Nickel Plate, ℔ doz., $2.00; Silver Plate, $4.00.

Packing—
Asbestos Packing, Wick and Rope.....*20@25¢*

Rubber—
(*Fair quality goods.*)
Sheet, C. I......*11@12¢*
Sheet, C. O. S......*11@12¢*
Sheet, C. B. S......*12@13¢*
Sheet, Pure Gum.....*40@45¢*
Sheet, Red.....*40@50¢*
Jenkins' '96, ℔ lb. 80¢.....25%

Miscellaneous—
American Packing...*lb. 7@10 ¢*
Cotton Packing.....*lb. 16@25 ¢*
Italian Packing.....*lb. 9@12½¢*
Jute.....*lb. 4@4½¢*
Russia Packing.....*lb. 8@11 ¢*

Pails, Creamery—
R. M. Co., with gauges, ℔ doz., No. 1, $6.25; No. 2, $6.50.

Pails, Water, Well, &c.—
See *Buckets.*

Pans— Dripping—
Standard List.....*70&10%*
Edwards, Royal Blue.....65&7½%

Fry—
Common Lipped:

Nos.	1	2	3	4	5
Per doz	$0.75	0.80	0.90	1.10	1.30

Refrigerator, Galva.—

Inch	12	14	16	18
Per doz	$1.75	2.25	2.80	3.15

Roasting and Baking—
Regal, R. M. Co., ℔ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory, ℔ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ℔ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper
Asbestos:	*lb.*
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.	*3½to5¢*
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft.	*6¢*
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.	*3@15¢*

Per roll

Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll	*40@50¢*
Medium weight, 30 lbs. to roll	*50@55¢*
Heavy weight, 40 lbs. to roll	*65@70¢*
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.	
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton	*$50.00*
Red Rope Roofing, 250 sq. ft. per roll	*$1.75*

Tarred Paper—
1 ply (roll 400 sq. ft.), ton	*$31.00@$35.00*
2 ply, roll 108 sq. ft	*57¢*
3 ply, roll 108 sq. ft	*80¢*
Slater's Felt (roll 500 sq. ft.)	*76¢*

Sand and Emery—
Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth....25%
Emery Paper and Cl'h..50&10@60%

Parers— Apple—
Advance.....℔ doz. $4.00
Baldwin.....℔ doz. $4.00
Bonanza Improved.....each $6.50
Daisy.....℔ doz. $4.00
Dandy.....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....℔ doz. $15.00
Improved Bay State.....℔ doz. $36.00
Little Star.....℔ doz. $5.00
New Lightning.....℔ doz. $7.00
Reading 72.....℔ doz. $3.25
Reading 78.....℔ doz. $6.25
Rocking Table.....℔ doz. $6.20
Turn Table '98.....℔ doz. $8.00
White Mountain.....℔ doz. $5.00

Potato—
Saratoga ..... ℔ doz. $7.00
White Mountain ..... ℔ doz. $6.00

Picks and Mattocks—
List, Feb. 23, 1899 ..... 70&10@75%
Cronk's Handled Garden Mattock, ℔ doz., No. 2, $2.60; No. 3, $6.40.

Pinking Irons—
See *Irons, Pinking.*

Pins, Escutcheon—
Brass ..... 50&10@60%
Iron, list Nov. 11, '85 .. 60@60&10%

Pipe, Cast Iron Soil—
Carload lots.
Standard, 2-6 in. 50&10@50&10&5%
Extra Heavy, 2-6 in. ..... 65&10%
Fittings ..... 70&10@70&10&5%

Pipe, Merchant—
Consumers, Carloads.

	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
	%	%	%	%
⅛ & ¼ *in.*	66	50	59&5	43&5
⅜ *in.*	68	54	61&5	43&5
½ *in.*	70	58	63&5	51&5
¾ *to 6 in.*	71	64	68&5	58&5
7 *to 12 in.*	69	54	63&5	48&5

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 84%
Second-class 87%
NOTE.—Market irregular.

Pipe, Stove—

	Per 100 joints.	
Edwards' Nested:	C. L.	L. C. L.
5 in., Standard Blue	$6.25	$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.75
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50

Planes and Plane Irons—
Wood Planes—
Bench, first qual. ..... 30@30&10%
Bench, second qual. ..... 40@40&10%
Molding ..... 25@25&10%
Bailey's (Stanley R. & L. Co.) 35&2½%
Chapin-Stephens Co.:
Bench, First Quality 30%
Bench, Second Quality 40%
Molding and Miscellaneous 25%
Toy and German 30%
Union 60%

Iron Planes—
Bailey's (Stanley R. & L. Co.) 35%
Chapin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 30&5%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06 ..... 25%
Buck Bros. 30%
Chapin-Stephens Co. 25%
Stanley R. & L. Co. 30%
Union 50%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse ..... ℔ doz. $8.00

Plates—
Felloe ..... lb. 4@4¼¢
Self-Sealing Pie Plates (R. M. Co.). ℔ doz. $2.00 ..... 50%

Pliers and Nippers—
Button Pliers ..... 75@75&10%
Gas Burner, per doz., 6 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.

Gas Pipe..	7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers ..... 50&5%
Cronk & Carrier Mfg. Co.:
American Button 80%
Improved Button ..... 75&10%
Cronk's 60%
No. 80 Linemen's 50%
Stub's Pattern 45%
Combination and others 33⅓%
Heller's Farriers' Nippers, Pincers and Tools ..... 40&5@40&10&5%
The Nettleton Mfg. Co. Reversible Cutting Nippers 40%
P., S. & W. Tinners' Cutting Nippers 40%
Wm. Schollhorn Co.:
Bernard, 33⅓%; Elm City, 33⅓%; Paragon, 50%; Lodi, 50%.
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels ..... 30@30&10%
Chapin's Imp. Brass Cor. 40@40&10%
Pocket Levels ..... 30@30&10%
Extension Sights ..... 30@30&10%
Machinists' Levels ..... 40@40&10%
Disston's Plumbs and Levels ..... 60&10%
Disston's Pocket Levels ..... 60&10%
C. E. Jennings & Co.'s Iron 33⅓%
C. E. Jennings & Co.'s Iron, Adjustable ..... 40&7½%
Stanley R. & L. Co. 40%
Stanley's Duplex 35%
Woods' Extension 33⅓%

Poachers, Egg—
Buffalo Steam Egg Poachers. ℔ doz. No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00 ..... 50%

Points, Glaziers'—
Bulk and 1-lb. papers ..... lb. 10¢
½-lb. papers ..... lb. 9@10¼¢
¼-lb. papers ..... lb. 9¾@11¢

Pokes, Animal—
Ft. Madison Hawkeye ..... ℔ doz. $3.25
Ft. Madison Western ..... ℔ doz. $4.80

Police Goods—
Manufacturers' Lists .. 25@25&5%
Tower's 50%

Polish—Metal, Etc—
Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.00.. 40%
Prestoline Paste 40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50, ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans., ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can.... each, $0.65
Ladd's Black Beauty Liquid, per 100 tins $6.75
Joseph Dixon's, ℔ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ℔ lb 8¢
Fireside ..... ℔ gr. $2.50
Gem, ℔ gr, $4.50 ..... 10%
Japanese ..... ℔ gr. $3.50
Jet Black ..... ℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans., ℔ doz. $1.50
Wynn's Black Silk:
Paste, cans, ℔ doz., 5 oz., $0.75; ½ lb, $1.00; 1 lb $1.75
Paste, ℔ 5 lb can $0.70
Liquid, cans, ℔ doz., 6 oz., $0.75; ½ pt., $1.00; 1 pt $1.75
Steel Range Enamel, ℔ doz., ¼ pt., $1.00; ½ pt., $1.25.

Poppers, Corn—
1 qt. Square..doz. $0.80; gro. $8.00
1 qt. Round..doz. $0.90; gro. $9.00
1½ qt. Square.doz. $1.00; gro. $10.00
2 qt. Square..doz. $1.20; gro. $12.00

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts ..... each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled ..... 35&10%
Tinned ..... 30&10%

Powder—
In Canisters:
Duck, 1 lb ..... *each* 45¢
Fine Sporting, 1 lb. ... *each* 75¢
Rifle, ½-lb ..... *each* 15¢
Rifle, 1-lb ..... *each* 25¢
In Kegs:
12½-lb. kegs $3.50
25-lb. kegs $4.50
King's Semi-Smokeless:

Keg (25 lb bulk)		$6.50
Half Keg (12½ lb bulk)		$3.50
Quarter Keg (6¼ lb bulk)		$1.90
Case 24 (1 lb cans bulk)		$8.50
Half case (1 lb cans bulk)		$4.50
King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c, bk)	7.25	8.75

Robin Hood Sm'less Shot Gun.. 50&20%

Presses—
Fruit and Jelly—
Enterprise Mfg. Co. ..... 20@25%
Seal Presses—

Pruning Hooks and Shears—
See *Shears.*

Pullers, Nail—
Cyclops 60%
Miller's Falls, No. 3, ℔ doz., $12.00.. 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 ..... 50%
Pearson No. 1, Cyclone Spike Puller, each $30.00 ..... 50%
Scranton, Case Lots:
No. 2B (large) $5.50
No. 3B (small) $5.00
Smith & Hemenway Co.:
Diamond B, case lots, ℔ doz., Large, $9.00; Small, $7.50.
Giant No. 1, ℔ doz., $18; No. 1½, $16.50; No. 3, $15 ..... 33⅓%
Staple Pullers, Utica and Davison 60%
Parrot Tack and Stub Puller, ℔ doz., 75c.: ℔ gro., $6.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05

Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.25; 5 in., $1.55

Inch	2	2¼	2½
Hot House, doz.	$0.65	.85	1.20
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction.. 60&10%
Dumb Waiter, Anti-Friction.. 60&10%
Electric Light 60%
Side, Anti-Friction ..... 60&10%

Sash Pulleys—
Common Frame; Square or Round End, per doz, 1¾ and 2 in. ..... 16@19¢
Anger Mortise, no Face Plate per doz., 1¾ and 2 in. .... 17@19¢
Acme, No. 35, 1¾ in., 18¼¢; 2 in., 23¼¢
Nox-All-Steel, Nos. 3 and 7, 2 in.. ℔ doz. 50%
Grand Rapids All Steel Noiseless.. 50%
Ideal ..... 70&5%
Niagara, No. 25, 1¾ in., 18½¢; 2 in., 20½¢
No. 26, Troy, 1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26..1¾ in., 18½¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern 60%
Pitcher Spout ..... 75&5@75&10%
Wood Pumps, Tubing, &c. .45@50%
Barnes Dbl. Acting (low list).. 40&10%
Barnes Pitcher Spout ..... 75&10%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co. $16.00
Daisy Spray Pump ..... ℔ doz. $6.50
Flint & Walling's, Fast Mail Hand, (low list) 55%
Flint & Walling's Fast Mail (low list) 55%
Flint & Walling's Tight Top Pitcher. ..... 75&10&5%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50 ..... 30%
Myers' Pumps (low list) ..... 40&10%
Myers' Power Pumps ..... 40&10%
Myers' Spray Pumps ..... 40&10%

Pump Leathers—
Plunger and Lower Valve—Per gro.:

Inch...	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00
Inch...	3	3¼	3½	3¾	4
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch...	2½	3	3½	4
	$2.75	3.85	5.00	6.00

Punches—
Saddlers' or Drive, good ..... *doz. 50@75¢*
Spring, single tube, good quality ..... $1.75@2.00
Revolving (4 tubes) ..... *doz. $3.50@3.75*
Bemis & Call Co.'s Cast St'l Drive. 50%
Morrill's Nos. 1AA, 1A, 1B, 1C, $15.00 ..... 50%
Hercules, 1 die, each $5.00 ..... 50%
Niagara Hollow Punches 40%
Niagara Solid Punches ..... 55&10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 33⅓%; Paragon, 50%; Lodi 50%
Tinners' Hollow, P., S. & W. Co. 33⅓%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44 ..... 50%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron ..... 2½@2¾¢
Sliding Door, Wrought Brass, 1¼ in., lb., 36¢ 50%
Allith Mfg. Co.: Reliable Hanger Track 50%
Cronk's:
Double Braced Steel Rail..℔ ft. 3¼¢
O. N. T. Rail ..... 3¢
Hinge Rail ..... 396¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.80.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $3.96.
O. N. T., ℔ 100 ft., 1 in., $3.00; 1¼ in., $3.60; 1½ in., $4.00.
Standard, 1¼ in. ..... ℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $3.00
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢ .. 50%
None Better ..... ℔ ft. 3¾¢
Standard ..... ℔ ft. 4¢
Myers' Stayon Track ..... 60&10%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail.. 60&10%
Lag Screw Rail, No. 65 ..... 50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢, No. 50 ..... 60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.
Stowell's:
Cast Rail ..... ℔ ft. 2¼¢
Steel Rail, Plain 25%
Wrought Bracket, 1 3-16 in.... ℔ ft. 3¢
Wrought Bracket, 1½ x 5-16.. ℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢ 60%
P. L. B. Steel Rail ..... ℔ 100 ft. $3.00
No. 0, 1 x 3-16 ..... ℔ 100 ft. $3.00

Rakes—
NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn.... $3.25
Fort Madison Blue Head Lawn.... $2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net $4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00.. 75%
Victor Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00 ..... 60%
Queen City Lawn, ℔ doz., 20 teeth, $2.85; 24, $3.00 ..... net
Anticlog Lawn, ℔ doz $4.00
Malleable Garden ..... 70&10%
Ideal Steel Garden, ℔ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00 ..... 80%
Kohler's:
Lawn Queen, 20-tooth.... ℔ doz. $2.90
Lawn Queen, 24-tooth.... ℔ doz. $3.00
Paragon, 20-tooth ..... ℔ doz. $2.70
Paragon, 24-tooth ..... ℔ doz. $2.75
Steel Garden, 14-tooth.... ℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—
Disston's 75%
Heller Bros. ..... 70&5@70&10&5%
Liverlight Bros.' Gold Medal. 70&10@75%
New Nicholson ..... 70&10@75%
See also Files.

Razors—
Liana Bo-ras-ic 60%
Fox Razors, ℔ doz., No. 42, $30.00; No. 44, $20.00; No. 82, Platina, $25.00 ..... 25%
Red Devil 50%
Silberstein:
Carbo Magnetic, $21.00; Griffon, No. 65, $13.50; Griffon, No. 00, $12.00; all other Razors, 40%.

Safety Razors—
Kampfe Bros.:
Star Safety, 25%; Star Interchangeable, 25%; Star Safety Corn, 25%.
Silberstein 40%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo 20%
Aluminum, German Silv., Bronze. 25%
1240 N, 124 N 20%
3004 N, 06 N, 6 RM, G 9 ..... 25%
4 N, 6 PN, 24 N, 28 PN 20%
2904 P, 33¼%; 2904 PN, 33¼%; 0024 N., 33¼%; 02084 N., 33¼%; 002904 PN., 33⅓%; 802 N., 33⅓% 25%
986 PN, 2904 N, 974 PN 25%
5009 PN, 5009 N 20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR 20%
304 P, 304 PN, 00304 P, 00304 PN. 33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed ..... 66⅔%@66⅔&10%
White Porcelain Enamel 60%
Solid Brass or Bronze Metal, ... 40&10%

Revolvers—
Single Action ..... 95¢@$1.00
Double Action, except 44 cal. $1.85
Double Action, 44 caliber $2.00
Automatic $3.25
Hammerless $3.75

Riddles, Hardware Grade
16 in. ..... *per doz.* $2.50@$2.75
17 in. ..... *per doz.* $2.75@$3.00
18 in. ..... *per doz.* $3.00@$3.25

Rings and Ringers—
Bull Rings—

	2	2½	3 *inch.*
Steel	$0.70	0.75	0.80 *doz.*
Copper	$1.00	1.15	1.40 *doz.*

Rea's Improved Self-Piercing, ℔ doz., Copper, 2 in., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—
Hill's Rings, gro. boxes $3.00@$4.50
Hill's Ringers, Gray Iron ..... *doz. 50@55¢*
Hill's Ringers, Malleable Iron.. doz. 70@75¢
Blair's Rings...per gro. $4.75@5.25
Blair's Ringers.per doz. $0.60@.65
Brown's Rings..per gro. $5.00@5.50
Brown's Ringers.per doz. $0.60@.65

Rivets and Burrs—
Copper ..... 33⅓@35%
Carriage, Coopers', Tinners, &c.: Black ..... 70&10%
Metallic Tinned 70%

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 23@25¢; Tin boxes, 29@32¢.
Tubular, per doz. boxes, 50 count, 42¢; 100 count, 51@58¢.

Rollers—
Acme, Stowell's Anti-Friction.... 50%
Cronk's Stay No. 65, $0.90; No. 50 ..... $1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56 ..... $0.84
Lane's Stay 40%
Richards' Stay:
Handy Adj. and Reversible No. $3.75¢
O. K. Adj. and Reversible No. $8.50¢
Lag Screw, Nos. 55 and 57 ..... 50%
Underwriters', Nos. 59, 60 ..... 50%
Favorite, No. 54 ..... 60%
Stowell's Barn Door Stay.. ℔ doz. $1.00
Swett's Anti-Friction 50%
Screw and Spike Stay ..... ℔ doz. 65¢
Hinge Adjustable Stay ..... ℔ doz. 90¢

Rope—
Manila, 7-16 in. diam. and larger: Pure ..... *lb., 12½@13¢*
Sisal, 7-16 in. diam. and larger: Pure ..... *lb., 9¼¢*
Sisal, 7-16 in. diam. and larger: No. 2 quality ..... *lb., 7¾@8¢*
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed ..... *lb., 7¾@8¢*
Pure ..... *lb., 9¼¢*
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed ..... *lb., 7@7½¢*
Pure ..... *lb, 8¢*
Cotton Rope: Best, ¼-in. and larger..17@18¢
Medium, ¼-in. and larger.16@ 17¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope: Thread, No. 1, ¼-in. & up, lb., 9¢
Thread, No. 2, ¼-in. & up, lb., 8½¢
Old Colony Manila Transmission Rope ..... ℔ lb 17½¢

Wire Rope—
Galvanized ..... 37½&21½%
Plain ..... 45&21½%

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal 20%

Rules
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory ..... 25&25&10%
Miscellaneous ..... 55@55&10%
Stephens' Combination 55%
Stationers' 10%

Keuffel & Esser Co.:
Folding, Wood....35&10%
Folding, Steel....33⅓&10%
Lufkin's Steel....50&10%
Lufkin's Lumber....60%
Stanley R. & L. Co.:
Boxwood....60%
Ivory....45%
Miscellaneous....60%
Zig Zag....40%
Zig Zag, Pin Joint....42½%
Upson Nut Co.:
Boxwood....60@60&10%
Ivory....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular....45%
Band....50@50&10%
Butcher Saws....50%
Cross Cuts....35%
One-Man Cross Cut....40%
Narrow Cross Cut....50%
Hand, Rip and Panel....35&5%
Miter Box and Compass....40%
Mulay, Mill and Drag....45%
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws....30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth.50%
Band, 2 to 18 in. wide....60%
Band, ¼ to 1¾....60%
Crosscuts....45%
Narrow Crosscuts....50%
Mulay, Mill and Drag....50%
Framed Woodsaws....25%
Woodsaw Blades....25%
Woodsaw Rods, Tinned....15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8....25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination....30%
Compass, Key Hole, &c....25%
Butcher Saws and Blades....30%
C. E. Jennings & Co.'s:
Back Saws....25%
Butcher Saws....30%
Compass and Key Hole Saws..35&5%
Framed Wood Saws....30%
Hand Saws....20&2½%
Wood Saw Blades....35%
Millers Falls:
Butcher Saws....15&10%
Star Saw Blades....15&10%
Massachusetts Saw Works:
Victor Kitchen Saws....40&10&50%
Butcher Saws Blades....35@40%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws....45%
Crescent Ground Cross Cut Saws..30%
One-Man Cross Cuts....40&10%
Gang Mill, Mulay and Drag Saws.45%
Band Saws....50%
Back Saws....25@25&7½%
Butcher Saws....35@35&7½%
Hand Saws....25@25&7½%
Hand Saws, Bay State Brand....45%
Compass, Key Hole, &c..25@25&7½%
Wood Saws....40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws....50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades....25%
Keystone Blades....35%
Hack Saw Frames....30%
Simonds File Co....35%
C. E. Jennings & Co.'s
Hack Saw Frames, Nos. 175, 180....40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades....40&10%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Star Hack Saws and Blades....15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames..30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades....25%
Victor Hack Saw Frames....40%

Scroll—
Barnes, No. 7, $15....25%
Barnes' Scroll Saw Blades....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20....20%
Lester, complete, $10.00....15&10%
Rogers, complete, $3.50 and $4.00....15&10%

Scales—
Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs....doz. $5.50
Two Platforms, ½ oz. to 8 lbs....doz. $16.00
Union Platform, Plain..$1.70@1.90
Union Platform, Stpd.$1.85@2.15
Chatillon's:
Eureka....25%
Favorite....40%
Crocers' Trip Scales....50%
Chicago Scale Co.:
The Little Detective....25 lbs 50%
Union or Family No. 2....60%
Portable Platform (reduced list)..50%
Wagon or Stock (reduced list)..25@35%
The Standard Portables....45%
The Standard R. R. and Wagon....50&10%

Scrapers—
Box, 1 Handle....doz. $2.00@2.25
Box, 2 Handle....doz. $2.50@2.80
Ship....Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00....45%
Chapin-Stephens Co., Box...30@30&10%

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood....20@20&10%
Hand, Wood....20@20&10%
R. Bliss Mfg. Co., Hand..20&5@20&10%
Chapin-Stephens Co., Hand....20%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99....75&15%
Coach, Gimlet Point, list Oct. 1, '99....75&10%
Hand Rail, list Jan. 1, '81....70&10@75%

Jack Screws—
Standard List....75%
Millers Falls....50&10&10%
P., S. & W....50%
Swett Iron Works....75@80%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron....50@50&10%
Flat or Round Head, Brass....50@50&10%

Set and Cap—
Set (Iron)....75&10&7½%
Set (Steel), net advance over Iron....25%
Sq. Hd. Cap....70&10&7½%
Hex. Hd. Cap....70&10&7½%
Rd. Hd. Cap....50&7½%
Fillister Hd. Cap....60&7½%

Wood—
List July 23, 1903.
Flat Head, Iron....87½&5@..%
Round Head, Iron....85&5@..%
Flat Head, Brass....82½&5@..%
Round Head, Brass....80&5@..%
Flat Head, Bronze...77½&5@..%
Round Head, Bronze..75&5@..%
Drive Screws....87½&5@..%

Scroll Saws—
See *Saws, Scroll.*

Scythes—
	Per doz.
Grass, No. 1, Plain	$6.25@6.75
Clipper, Bronzed Webb	$6.50@7.00
No. 3 Clipper, Pol'd Webb	$6.75@7.25
No. 6 Clipper and Solid Steel	$7.00@7.50
Bush, Weed and Bramble, No. 2	$6.50@7.00
Grain, No. 1	$8.25@8.75
Bronzed Webb, No. 1	$8.50@9.00
Nos. 3 and 4 Clipper, Grain	$8.75@9.25
Solid Steel, No. 6	$9.25@9.75

Seeders, Raisin—
Enterprise....25@30%

Sets— Awl and Tool—
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7....50%
C. E. Jennings & Co.'s Model Tool Holders....30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18....15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel....⅌ doz sets $9.00

Sets, Nail—
Octagon	*gro. $3.50@3.75*
Buck Bros.	27½%
Cannon's Diamond Point, ⅌ gro.	$12.40%
Mayhew's	⅌ gro. $9.00
Snell's Corrugated, Cup Pt.	⅌ gro. $7.20
Snell's Knurled, Cup Pt.	⅌ gro. $7.20
Victor Knurled Cup Pt.	⅌ gro. $7.50

Rivet—
Regular list....75@75&10%

Saw—
Atkin's:
Criterion....40%
Adjustable....40%
Disston's Star, Monarch and Triumph....30%
Morrill's No. 1....$15.00 } 25
Nos. 3 and 4, Cross Cut....$20.60
No. 5, Mill....$30.00
Nos. 10, 11, 95....$15.60 } 50
No. 1 Old Style....$10.00
Special....$16.25
Giant Royal Cross Cut....⅌ doz. $8.00
Royal, Hand....⅌ doz. $4.50
Taintor Positive....⅌ doz. $4.75

Shaving
Fox Shaving Sets, No. 30....⅌ doz., net, $24.00
Smith & Hemenway Co.'s....60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co....70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ⅌ doz....$1.50
Mounted Kitchen Sand Stone, ⅌ doz....$1.50
Natural Grit Carving Knife Hones, ⅌ doz....$3.00
Quick Cut Emery Carving Knife Hones, ⅌ doz....$1.50
Quick Edge Pocket Knife Hones, ⅌ doz....$2.50
} 25 50

Skate—
Smith & Hemenway Co., Eureka..20%

Shaves, Spoke—
Iron....doz.$1.10@1.25
Wood....doz.$1.75@2.25
Bailey's (Stanley R. & L. Co.)....45%
Razor Edge (Stanley R. & L. Co.), Iron, 50%; Wood....55%
Chapin-Stephens Co....30@30&10%
Goodell's, ⅌ doz. $9.00....15&10%
Wood's F1 and F2....50%

Shears—
Cast Iron	7	8	9 in.
Best	$16.00	18.00	20.00 gro.
Good	$13.00	15.00	17.00 gro.
Cheap	$5.00	6.00	7.00 gro.

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Fair quality, Jap....80@80&5%
Fair quality, Nickel..75@75&10%
Tailors' Shears....40@40&10%
Acme Cast Shears....40@40&5%
Heinisch's Tailor's Shears....10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list....30&10&5%
Grass....50&10%
Horse or Mule....50&10%

Tinners' Snips—
Steel Blades....20&5@20&10%
Steel Laid Blades....40&10@50%
Forged Handles, Steel Blades, Berlin....50%
Heinisch's Snips....40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in....50%
Niagara Snips....40%
P., S. & W. Forged Handles....20%

Pruning Shears—
Cronk's Hand Shears....33⅓%
Cronk's Wood Handle Shears....33⅓%
Disston's Combined Pruning Hook and Saw, ⅌ doz. $18.00....25%
Disston's Pruning Hook only, ⅌ doz., $12.00....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades....40%
P., S. & W. Co....30%
Wilkinson Shear & Cutlery Co.:
Hedge, Wilcut Brand....60&10%
Lawn and Border, Wilcut Brand....60&10%

Sheaves—Sliding Door—
Stowell's Anti-Friction....50%
Reading....40%
R. & E. list....15%
Wrightsville Hatfield Pattern....87½%

Sliding Shutter—
Reading list....40%
R. & E. list....10%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, 10 and 12 gauge....65&10%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade, 25&5%
Union, League, 12 and 12 gauge; Rival Grade....25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge....20&5%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade..20%
Expert, 10, 12, 16 and 20 gauge, 33⅓&5%
Robin Hood, Low Brass....20&5%
Robin Hood, High Brass....30&5%
Indian, for Black Powder....25&5%

Shells, Loaded—
Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade....40&5%
Loaded with Smokeless Powder, high grade....40&10&10%
Robin Hood:
Smokeless Robin Hood, Low Brass....50%
Smokeless Comets, High Brass, 50&10&5%
Indian, Black Powder....40&5%
Winchester:
Smokeless Repeater Grade....40&5%
Smokeless Leader Grade...40&10&10%
Black Powder....40%

Shingles, Metal— Per Sq.
Edwards Mfg. Co.:

	Painted.	Galv.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:

	Tin Painted.	Galv.
Dixie, 14 x 20 in.	$4.25	$5.50
Dixie, 10 x 14 in.	4.50	6.00
Dixie, 7 x 10 in.	5.00	6.75

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron....per keg.$4.10
Steel....per keg.$3.85
Burden's, all sizes....⅌ keg $3.90

Shot—
	25-lb. bag.
Drop, up to B	$1.95
Drop, B and larger	2.20
Buck	2.20
Chilled	2.20
Dust	2.40

Shovels and Spades—
Association List, Nov. 15, 1902..40%

Snow Shovels—
Long Handle....$2.75@3.00
Wood and Mail, D. Handle, $3.25@3.50

Sieves and Sifters—
Hunter's Imitation....gro.$9.50@10.00
Hunter's Genuine....per gro. $12.00@12.50
Buffalo Metallic Blued, R. M. Co., ⅌ gr.

14&16	16&18	18&20
$13.20	$13.50	$14.40

Sieves, Seamless Metallic
—Per dozen.—

Mesh	½	16	18	20
Iron Wire	$1.05	1.05	1.10	1.20
Tinned Wire	$1.15	1.15	1.20	1.30

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in....60%
20 x 40 to 24 x 50 in....50%
24 x 60 to 24 x 120 in....30%
Barnes' low list:
Up to and including 20 x 36 in....50%
20 x 40 to 24 x 50 in....45%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron....70@75&10%
Steel....40@45%

Slates, School—
Factory Shipments.
"D" Slates....50@50&10%
Eureka, Unexcelled Noiseless..60&5 tens
Victor A, Noiseless..60&4 tens 65%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German....40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%....
High Grade, 40%; Trojan....40%
Jockey....25%
Oneida Community:
Harness Snaps, 1 inch....60&5%
Swivel Snaps....60%
Swivels....50%

Snaths—
Scythe....50%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality....50&10@60&5%
Cheap....60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton....50&10%
Rogers & Bro., William Rogers' Eagle Brand....50&10%
Anchor, Rogers Brand....60%
Wm. Rogers & Son....60&10%

Miscellaneous—
German Silver....60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver....50%

Tinned Iron—
Teas....per gro. 45@50¢
Tables....per gro.$0.50@$1.00

Springs— Door—
Bardsley's Spring and Check....40%
Chicago (Coil)....40&10%
Gem (Coil)....20%
Pullman (Coil)....35%
Reliance (Coil)....40&10%
Star (Coil)....30%
Torrey's Rod, 39 in....⅌ doz. $1.10

Carriage, Wagon, &c.—

	Per lb
1¼ in. and Wider:	
Black	4@4¼¢
Half Bright	4@4¼¢
Bright	4½@4¾¢
Painted Seat Springs:	
1½ x 2 x 26....per pr.	42¢
1½ x 3 x 28....per pr.	70¢

Sprinklers, Lawn—
Enterprise....25@30%
Philadelphia No. 1, ⅌ doz. $12; No. 2, $15; No. 3, $20....30%
Pieuger & Henger Mfg. Co.:
Cactus, 65&5%; Japanese, 70&5%; Nationals, 60&5%.

Squares—
Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron. } *75@—%*
Rosewood Hdl. Try Square and T-Bevels....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels....40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60&10%; Iron Stock and Bevel....15%
Winterbottom's Try and Miter, No. 1, 35%; No. 2....45%

Squeezers, Lemon
Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap....doz. $1.00
Good Grade....doz. $1.25
Tinned Iron....doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—
Barbed Blind....lb. 6@6½¢
Electricians', Association list..80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized....$2.55
Poultry Netting Staples....per lb. 3¼@3½¢

Steels, Butchers'—
Dick's....30%
Foster Bros.'....30%
C. & A. Hoffmann's....40%

Steelyards—....30@30&10%

Stocks and Dies—
Blacksmiths'....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates....25%
Green River....25%
Lightning Screw Plate....25%
Little Giant....25%
Reece's New Screw Plates....25%

Stoners, Cherry—
Enterprise....25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Oil, Double Grit....65%
Gem Axe, Single or Double Grit..65%
Gem Slips....65%
Gem Razor Hones....50%
Pike Mfg. Co., 1904 list: ⅌ lb.
Arkansas St. No. 1, 3 to 5½ in..$2.80
Arkansas St. No. 1, 5½ to 8 in..$3.50
Arkansas Slips No. 1....$4.00
Lily White Washita, 4 to 8 in..60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in..50¢
Washita St., No. 1, 4 to 8 in..40¢
Washita St., No. 2, 4 to 8 in..30¢
Lily White Slips....90¢
Rosy Red Slips....90¢
Washita Slips, Extra....80¢
Washita Slips, No. 1....70¢
Washita Slips, No. 2....40¢
India Oil Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit....33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit....33⅓%
Quickcut Emery Rubbing Bricks..33⅓%
Hindostan No. 1, R'g'lar. ⅌ lb. 8¢
Hindostan No. 1, Small.. ⅌ lb. 10¢
Axe Stones (all kinds)....
Turkey Oil Stones, Extra, 5 to 8 in....⅌ lb. 80¢
Queer Creek Stones, 4 to 8 in..20¢
Queer Creek Slips....40¢
Sanil Stone....
} 33⅓%
} 33⅓%

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem, ₱ gro., 10 in., $8.00; 12 in., $10.80.
Norton Alundum Scythe Stones:
Less than 10 gross lots... ₱ gro. $6.00
Lots of 10 gross or more...₱ gro. $4.50
Pike Mfg. Co., 1901 list: 15¼%
Black Diamond S. S..₱ gro. $12.00
Lamoille S. S.....₱ gro. $11.00
White Mountain S. S.₱ gro. $9.00
Green Mountain S. S..₱ gro. $6.00
Extra Indian Pond S.S.₱ gro. $7.50
No. 1 Indian Pond S.S.₱ gro. $7.00
No. 2 Indian Pond S.S.₱ gro. $4.50
Leader Red End S. S.₱ gro. $4.50
Quick Cut Emery....₱ gro. $10.00
Pure Corundum.....₱ gro. $18.00
Crescent.....$7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers.....₱ gro. $9.00

Stops— Bench—

Millers Falls.....15&10%
Morrill's, ₱ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....20%

Straps— Box—

Cary's Universal, case lots....20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket .....doz. $1.60
Bullard, ₱ doz.....$4.00
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00.....20%

Woven Fence—

Franklin.....ea, $3.75

Strops, Razor—

Star Diagonal Strop.....25%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Co., list Jan. 1, 1902 .....30&5%

Sweepers, Carpet—

	₱ doz.
National Sweeper Co.:	
Louis XV, Roller Bearing, Gold Plated	$120.00
Hepplewhite, Roller Bearing, Silver Plated	$72.00
Sheraton, Roller Bearing, N'kel.	$60.00
Ye Mission, Roller Bearing, Oxidized Coppered	$36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled	$36.00
National Queen, Roller Bearing, Fancy Veneers	$27.00
Loyal, Roller Bearing, Veneers, Nickeled	$25.00
Triple Medal, Roller Bearing, Nickeled	$24.00
Marion, Roller Bearing, N'kel.	$24.00
Marion Queen, Roller Bearing, Nickeled	$21.00
Monarch, Roller Bearing, N'kel.	$22.00
Monarch, Roller Bearing, Jap.	$20.00
Perpetual, Regular B'r'gs, N'kel.	$20.00
Perpetual, Regular B'r'gs, Jap.	$18.00
Monarch Extra (17 in. case), Roller Bearing, Nickeled	$36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned	$33.00
Auditorium (26 in. case), Roller Bearing, Nickeled	$34.00
Mammoth (30 in. case), Roller Bearing, Nickeled	$60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:

	₱ doz.
Eureka Japanned	$15.00
Model E, Sanitaire	₱ doz $25.00
Model A, Sterling	₱ doz. $25.00
Model B, Sterling, Nickeled	₱ doz. $23.00
Model B, Sterling, Japanned	₱ doz. $21.00
Model C, Sterling	₱ doz. $21.50
Model D, Sterling	₱ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks..90&30%
American Cut Tacks.....90&30%
Swedes Cut Tacks.....90&30%
Swedes' Upholsterers'....90&10%
Gimp Tacks.....90&10%
Lace Tacks.....90&10%
Trimmers' Tacks.....90&30%
Looking Glass Tacks.....65%
Bill Posters' and Railroad Tacks, 90&10%
Hungarian Nails.....80&20%
Finishing Nails.....70%
Trunk and Clout Nails.....80%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks..... 90&5 or 5 tens

See also Nails, Wire.

Tanks, Oil—Each.

B. M. Co.:		
Gal.	Emerald	Queen City
30	$3.40	$3.65
60	$4.25	$4.50

Wilson & Friend Co.:		
Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin ..50@—%
Patent Leather.....25@50&5%
Steel .....33⅓ 1-3&5%
Chesterman's .....25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin.....40&10@50%
Metallic .....30@30&5%
Patent Bend, Leather....25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓&35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop.....80&2½%
Monitor, Cross Head,&c.60&10@65%

Brick Ties—

Niagara Brick Ties.....25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White.....20@20&5%

Hay—

Myers' Hay Tools.....50%
Stowell's Hay Carriers, 50%; Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co.'s, Davidson 25%

Saw—

Atkins' Cross Cut Saw Tools....35&5%
Simonds' Improved.....33⅓%
Simonds' Crescent.....25%

Ship—

L. & I. J. White.....25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro.....$11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida.....75@75&5%
Newhouse .....45@45&5%
Hawley & Norton.....65%
Victor .....70&10%
Oneida Community Jump.....50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, ₱ doz., $13.25; case of 24 .....$11.50 doz.
No. 3, Rat, ₱ doz., $6.50; case of 50 .....$5.75 doz.
No. 3½, Rat, ₱ doz. $5.25; case of 72 .....$4.70 doz.
No. 4, Mouse, ₱ doz. $3.85; case of 150 .....$3.00 doz.
No. 5, Mouse, ₱ doz. $3.00; case of 150 .....$2.25 doz.

Trimmers, Spoke—

Wood's E 1..:.....50%

Trowels—

Disston Brick and Pointing... .....25%
Disston Plastering.....20%
Disston "Standard Brand" and Garden Trowels.....30%
Kohler's Steel Garden Trowels, ₱ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels.. ₱ gro. $6.00
Rose Brick and Plastering.....25&5%
Woodrough & McFarlin, Plasterers' 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern.....50&10%
Western Pattern.....60&10%
Handy Trucks.....₱ doz. $16.00
Grocery .....₱ doz. $15.00
Daisy Stove Trucks, Improved Pattern .....₱ doz. $18.50
McKinney Trucks.....each $10.00
Model Stove Trucks.....₱ doz. $18.50

Tubs, Wash—

M'f'gr's list, price per gross.

No.	0	1	2	3
Galvanized,	$64	$76	$84	$96

10&5%

Galvanized Wash Tubs (R. M. Co.):

No.	1	2	3	10	20	30
Per doz., net.	$5.70	6.30	7.20	6.60	7.20	8.10

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls.23@25¢
No. 12, ¼ and ½-lb. Balls.21@22¢
No. 18, ¼ and ½-lb. Balls.18@20¢
No. 24, ¼ and ½-lb. Balls.17@19¢
No. 36, ¼ and ½-lb. Balls.16@18¢
Chalk Line, Cotton ¼-lb. Balls .....26@31¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....11@19¢
Cotton Wrapping, 5 Balls to lb., according to quality...15½@23¢
American 2-Ply Hemp, ¼ and ½-lb. Balls.....14½@15½¢
American 3-Ply Hemp. 1-lb. Balls .....15½@16½¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine).10½@11½¢
India 3-Ply Hemp, 1-lb. Balls 10½@11½¢
India 3-Ply Hemp, 1½-lb. Balls. 10@11¢
2, 3, 4 and 5-Ply Jute. ¼-lb. Balls .....12½@13½¢
Mason Line, Linen, ½-lb. Bls.47¢
No. 264 Mattress, ¼ and ½-lb. Balls, according to quality, 30@60¢
Wool, 3 to 6 ply....B 9¢; A 10¢

Vises—

Solid Box.....50&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable.....40%
Standard 40%
Amateur 25%
Columbian Hdw. Co.....40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting, Adjustable Jaw, 2@25&10%; Solid Jaw, 35@35&10%
Tiger Machinists'.....40%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00.
Fulton Mach. & Vise Co.:
Reed, Swivel.....25%
Star, Solid Jaw.....40%
Hollands':
Machinists' .....40@40&5%
Keystone .....65&5&70%
Lewis Tool Co.:
Adjustable Jaw.....30%
Monarch, 50%; Solid Jaw.....50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip.....15%
Merrill's 20%
Millers Falls Oval Slide Pattern.60&10%
Parker's:
Victor, 20@25%; Regulars.....20@25%
Vulcan's .....40@45%
Combination Pipe.....55@60%
Prentiss .....20@25%
Snediker's X. L.....33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 2 Clamp and Guide, ₱ doz., $24.00, 30%; Clamps.....30%
Perfection Saw Clamps, ₱ doz.....$4.50
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....50%

Wood Workers—

Fulton Mach. & Vise Co.:
Reed 25%
Star 40%
Massey Vise Co.:
Lightning Grip, 15%; Perfect.....15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe.....40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.

Wads—*Price per M.*

B. E., 11 up	.....60¢	*Dis. 15%*
B. E., 9 and 10	.....70¢	
B. E., 8	.....80¢	
B. E., 7	.....80¢	
P. E., 11 up	.....$1.00	
P. E., 9 and 10	..... 1.25	
P. E., 8	..... 1.50	
P. E., 7	..... 1.50	
Ely's B. E., 11 and larger.		$1.70@1.75
Ely's P. E., 12 to 20		$3.00@3.25

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled .....45&10%
Ground .....50&5%
Plain or Unground.....60%
Country Hollow Ware, per 100 lbs. $3.00
White Enameled Ware:
Maslin Kettles.....65&10%
Covered Wares:
Tinned and Turned.....35&10%
Enameled .....45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.....60%
Iron Clad Ware.....70&10%
Lava, Enameled.....40&10%
Never Break Enameled.....50%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles.....60%
Porcelained .....50&5@50&10%
Never Break Spiders and Griddles.. .....65&5%
Never Break Kettles.....60%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles..... .....60%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ₱ doz.
Crescent, family size, bent frame.$3.70
Red Star, family size, stationary protector $3.70
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.....$3.25
Cable Cross, family size, stationary protector.....$3.40
Single Zinc Surface:
Naied, family size, open back, perforated $2.90
Single Saginaw Globe.....$2.75
Brass Surface:
Brass King, Single Surface, open back $3.65
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.65
Glass Surface:
Glass King, Single Surface, open back $3.65
Enamel Surface:
Enamel King, Single Surface, ventilated back.....$3.65

Washers—Leather, Axle—

Solid .....50&10@80&10&10%
Patent .....90@90&5%
Coil: ¼ 10¢ ½ 11¢ 1¼ 12¢ 1¼ Inch. 14¢ per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers....$5.90 5.00 3.70 3.50 3.30
The above prices are based on $5.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¾@2¢

Weather Strip—

Flexible Felt—

Lined, per 100 ft., $2; $3; $4.....40&10%
Moore's Unlined, per 100 ft., $2; $3; $4 .....50&10%

Wedges—

Oil Finish.....lb. 2.70@2.80¢

Weights—Hitching—

Covert Mfg. Co.....30&2%

Sash—

Per ton, f.o.b. factory:
Eastern District.....$30.00
Southern Territory.$23.00@$24.00
Western and Central Districts .....$22.00@$28.00

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....80%
10 to 18.....80&2½%
19 to 26.....80&7½%
27 to 36.....80&2½%
Galvanized:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 16.....72½&10&2½%
19 to 26.....75%
27 to 36.....72½%
Coppered:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 18.....72½&10&2½%
19 to 26.....75&10&5%
27 to 36.....75%
Tinned:
6 to 14.....75&10&2½%
15 to 18.....75&7½%
Brass.....2½¢ lb., base
Copper .....32¢ lb., base
Cast Steel Wire.....50%

Spooled Wire—

Annealed and Tinned, 70&10@75&10%
Brass and Copper..60&10@65&10%
Retailers' Assortments, per box, $2.25@$2.50

Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods.....90&10%
Brass Wire Goods.....85&25%
Brass Cup and Shoulder Hooks, 80&15%

Wire Cloth and Netting—

Galvanized Wire Netting..... 80&2½@80&7½%
Painted Screen Cloth, 100 ft., $1.30
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft.3½¢
Nos. 4 and 5 Mesh, sq. ft..3½¢
No. 6 Mesh, sq. ft.....3¾¢
No. 8 Mesh, sq. ft.....4¼¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural .....75@75&10%
Alligator or Crocodile..70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S.....45@45&5%
Acme .....60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Steel Handle Nut.....50%
Combination Black.....40&5%
Merrick Pattern.....50%
Boardman's 40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle..... 40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Donohue's Engineer.....40&10%
Eagle 70%
Elgin Wrenches, ₱ doz.....$6.25
Elgin Rethreading Attachment, only with one die, ₱ doz.....$6.25
Elgin Extra Dies, ₱ doz.....$3.00
Elgin Extra Jaws, ₱ doz.....$1.75
Elgin Monkey Wrench Pipe Jaws, ₱ doz.....$2.10
Gem Pocket.....50%
Hercules 70%
W. & B. Machinist:
Case lots.....50&5%
Less than case lots.....50%
W. & B. Railroad Special:
Case lots.....50%
Less than case lots.....40&10&5%
Solid Handles, P., S. & W.....50&5%
Stillson 65%
Vulcan Chain.....50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ₱ gross, $7.50; ₱ doz.....$0.80

Wrought Goods—

Stables, Hooks, &c., list March 17, '02.....87½@87½&10%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters'.....list net

Zinc—

Sheet.....per 100 lb., $8.50@$8.75

For the Table of "Current Metal Prices" see the First Issue of Every Month.